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The Effect of Work Stress and Coping on Organizational Justice: An Empirical Investigation of Turkish Telecommunications and Banking Industries

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The aim of this paper is to investigate the role of coping mechanisms and work stress on employees' perceptions of organizational justice. A survey of 211 white-collar employees in the banking and telecommunications industries was taken. Multiple regression analyses were performed in order to understand the effect of coping mechanisms and work stress on organizational justice. The results showed that overall perception of justice is affected negatively by work stress and positively by coping mechanisms, except emotion-focused coping. However, sub-dimensions of organizational justice showed distinctive relationship patterns. Thus, it was concluded both individual and organizational determinants play a role in employees' perceptions of organizational justice.

Key words: organizational justice, work stress, coping, telecommunication, banking

Introduction

The issue of justice is important in the organizational context, as well as in daily life. Employees compare their wage, benefits, how they are treated, and how much they receive information. It is important for organizations to be seen as just by their employees, because several studies found significant negative relationships between perceptions of injustice on the part of employees and work related outcomes. Organizational justice is related with job performance (Aryee et al. 2015; Cropanzano, Prehar, and Chen 2002; Rupp and Cropanzano 2002), job satisfaction and turnover intentions (Akram et al. 2015; Alexander and Ruderman, 1987), organizational commitment

(De Cremer et al. 2004; Liden et al. 2003; Tepper 2000); counterproductive work behaviours (Fox, Spector, and Miles 2001; Jawahar and Stone 2015), trust (Colquitt and Rodel 2011; Katou 2013) and organizational citizenship behaviour (Liden et al. 2003; Moorman 1991; Rupp and Cropanzano 2002). These studies showed that organizational justice is an important matter which organizations must manage effectively. However, employees' comparisons contain their individual judgments, in other words their perceptions. The decision of the fairness of an organization depends on a highly subjective experience.

Employees who are facing the same sort of unfair practices might appraise these situations in different ways. As Greenberg (2001, 246) suggested, 'Justice might always be a potential concern, but that potential will materialize only sometimes'. An unfair distribution or treatment might still be considered fair depending on certain environmental and individual characteristics. Justice considerations are 'influenced by outcomes one receives from the organization, organizational practices and procedures, and characteristics of the perceiver' (Cohen-Charash and Spector 2001, 282). Since it is a perceptual attribution, individuals' personal characteristics play an important role in the process of evaluating fairness in the workplace. For example, the study by Wanberg, Bunce, and Gavin (1999) showed that employees who have high scores in negative affectivity are more likely to perceive their organization and organizational practices as being unfair compared to individuals with a low negative affectivity score. Besides the level of stress employees produce and strategies to deal with it, stress also depends upon their personal characteristics. Again, positive and negative affectivity alters individuals' responses against stressful situations, and their strain levels (Fogarty et al. 1999). Also, big five personality traits are related to different coping mechanisms in varied levels (Connor-Smith and Flachsbart 2007). Personality dimensions of extroversion and neuroticism are highly effective in explaining the stress levels of individuals (Fontana and Abouseri 1993). Emotional intelligence, in addition to being a highly personality-related construct, is also a good predictor of distress and avoidance (emotion-focused) coping mechanism (Matthews et al. 2006).

Investigating specific personality differences on organizational justice is not the main aim of the research; however, one should accept that the justice issue is highly perceptual and subjective. Therefore, stress levels and coping mechanisms, which depend highly upon one's personality, should not be underestimated while deter-

mining organizational justice perceptions. In order to broaden the understanding of differences in perceptions of organizational justice, work stress and coping mechanisms that are chosen to deal with stressful situations at work are considered here. A quick literature review on work stress, organizational justice, and coping mechanisms will be mentioned briefly. Then, the results of the research performed on 211 employees from the telecommunications and banking industries will be provided.

Literature Review

WORK STRESS

Psychological stress is defined as 'a relationship between the person and the environment that is appraised by taxing or exceeding his or her resources and endangering his or her well being' (Lazarus and Folkman 1984, 21). When it comes to work stress, definitions also follow the Person-Environment Fit as well. For example, Cooper and Marshall (1976, 11) conceptualizes work stress as 'a negative environmental factor or stressors (e.g. work overload, role conflict/ambiguity, poor working conditions) associated with a particular job'. Besides Blau (1981, 280) states, 'where either an environmental (job) demand exceeds a person's response capability, or the person's capabilities exceed the environmental demand, the resulting misfit represents stress'. It is clear from these conceptualizations that work stress requires an employee to feel a misfit between her capabilities, resources, or demands and the expectations from the work environment.

Work stressors that create an unfit for the employee can be classified into several dimensions. Stressors might be intrinsic to the job (e.g., poor physical working conditions, work overload, time pressures). They might be related to the role in the organization (e.g., role ambiguity, role conflict), related to career development (e.g., over promotion, under promotion, lack of job security), related to relationships at work (e.g., poor relations with the boss, subordinates or colleagues, difficulties in delegating responsibility), and/or related to organizational structure and climate (e.g. little or no participation in decision-making, office politics) (Cooper and Marshall 1976).

COPING MECHANISMS

Individuals' judgment about the person-environment relationship fit depends on their cognitive appraisal processes. Primary appraisal includes judgments about whether an encounter is irrelevant, benign-positive, or stressful. If an individual decides that a

situation is stressful, then in the secondary appraisal they evaluate the process and decide which coping options are available. Thus, coping is defined as 'constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person' (Lazarus and Folkman 1984, 141). Nevertheless, some individuals cannot simply adapt their attitudes and behaviours in accordance with the environmental demands, while others are able to do so (Cooper and Marshall 1976).

Coping mechanisms or strategies can be classified as problem-focused coping, emotion-focused coping, and social support-seeking coping mechanisms. Problem-focused coping refers to the 'attempts to alter or manage the situation', while emotion-focused coping refers to 'attempts to reduce or manage emotional distress' (Latack 1986, 377). On the other hand, 'attempts to obtain advice or express emotions' are identified as coping by seeking social support (Litman 2006, 274).

ORGANIZATIONAL JUSTICE

The literature on organizational justice was primarily concerned with fairness of resource distribution, referred to later as *distributive justice*. Adams' (1963) equity theory can be shown as the basis for distributive justice, and carries with it the main assumption that inequity results from the inconsistencies between the inputs and outcomes of one person relative to another. Thus, whenever a person feels that his/her inputs and outcomes are not congruent with the reference person's inputs and outputs, inequity exists (Adams 1963). Later work that focused on the appropriateness of resource allocation processes, or the justice of the processes that lead to decision outcomes, pointed out procedural justice (Colquitt 2001; Cropanzano, Bowen, and Gilliland 2007).

However, as time passed it became clear that it is not only the distribution of outcomes or decision-making processes that influence perceptions of fairness (Bies 2001). People are also influenced by the interpersonal treatment they receive from others. A third form of justice, interactional justice, was coined by Bies and Moag (1986) and defined as 'people's concerns about the quality of interpersonal treatment they receive during the enactment of organizational procedures'. In recent years, interactional justice perception has started to be evaluated in two sub-dimensions as interpersonal and interactional justice. Interpersonal justice is defined as 'the degree to which people are treated with politeness, dignity, and respect by authori-

ties or third parties involved in executing procedures or determining outcomes', while informational justice 'focuses on the explanations provided to people that convey information about what procedures were used in a certain way or why outcomes were distributed in a certain fashion' (Colquitt et al. 2001, 427).

THE EFFECT OF WORK STRESS AND COPING ON JUSTICE PERCEPTIONS

Adams (1963) proposed that inequity carries a stress mechanism and this idea has been supported by further studies showing that injustice perception produces stress and stress related health problems via directly influence strain, and via mediating or moderating the stress and strain relationship (e.g., Elovainio, Kivimaki, and Vahtera 2002; Judge and Colquitt 2004; Tepper 2000; 2001; Zohar 1995). Organizational justice dimensions have significant relationships between psychological distress and stress symptoms of depression, anxiety and emotional exhaustion (Tepper 2000; 2001). There are also other approaches to justice and stress relationship such that organizational justice perceptions are considered as an additional source of stress. Role justice concept and proposing justice as a work stressor while examining its relationship with counterproductive work behaviours are examples of this view (Fox, Spector, and Miles 2001; Zohar 1995). Contrary to the common conceptualization in the literature, this paper views work stress as an antecedent of organizational justice perception. In other words, several work related stressors effect employees' perceptions of organizational justice.

As for work stress and coping mechanisms, studies showed that chosen coping strategies create differences in individuals' stress levels. Peng et al. (2012) found that emotion-focused coping has a significant relationship with psychological distress, while problem-focused and social support-seeking coping styles do not. Snow et al. (2003) have found similar results with emotion-focused coping and negative psychological outcomes. It was generally the result that problem-focused coping is positively related to employee wellbeing, while emotion-focused coping is negatively related (Tsaur and Tang 2012; Sunny-Hu and Cheng 2010). Also, these coping strategies have buffering and moderating effects on the relationship between work stress and wellbeing (Tsaur and Tang 2012). Moreover, social support from co-workers and supervisors can reduce the stress levels of employees and help them use active coping strategies more (Blau 1981; Snow et al. 2003). Previous studies have shown that work stress and coping mechanisms are closely related to the organizational jus-

tice perceptions of the employees. However, previous models on the topic have proposed a reverse relationship: organizational justice affects work stress. In this paper, it is thought that injustice practices at work are insufficient to explain work stress. Some stressors related to work might highly affect organizational justice perceptions, yet while studying work stress, as an aggregate construct, it is difficult to distinguish the unique effect of organizational justice perceptions among lots of work stressors that are highly interweaving. It is not asserted here that organizational justice can't be a predictor of work stress; rather it is more meaningful for organizational justice to be a consequence of work stress. Employees who are more stressed might be more alerted for unjust situations. Stressful situations and individual characteristics/attitudes might be more affective on the formation of justice perceptions in a highly complex work environment. Thus, the following hypotheses are proposed in this study:

- H1 *Overall justice perception will be affected by work stress and coping mechanisms more specifically justice will be affected negatively by work stress and positively by coping mechanisms.*
- H2 *Procedural justice perception will be affected negatively by work stress and positively by coping mechanisms.*
- H3 *Distributive justice perception will be affected negatively by work stress and positively by coping mechanisms.*
- H4 *Informational justice perception will be affected negatively by work stress and positively by coping mechanisms.*
- H5 *Interpersonal justice perception will be affected negatively by work stress and positively by coping mechanisms.*

Method

The analyses were based on the data collected from 211 participants working in banking and telecommunications industries. All items used in this study were taken from previously used and validated scales. They were independently translated, and then back translated by bilinguals. Differences between the original and the translated version were assessed, and some items were changed. To further determine the validity of scales, explanatory factor analyses and reliability analyses were carried out. While testing the proposed hypotheses, regression analyses were applied. According to collinearity statistics, tolerance and VIF, multicollinearity is not a concern affecting the proposed models. The findings will be presented in the following sections.

SAMPLE

211 employees from different institutions in the banking and telecommunications industries participated in the study. Banking employees were considered due to the findings of previous studies showing the industry as highly stressful and competitive (e.g., Khattak et al. 2011; Michailidis and Georgiou 2005). The telecommunications industry was also chosen due to major restructuring attempts after privatization and liberalization of the industry in recent years in Turkey. After these privatization processes, there has been huge amount of ambiguity regarding job security and organizational change. Thus, employees from two industries that are highly insecure and competitive were selected for inclusion in the sample.

In order to collect data, the convenience sampling method was used. People who wanted to participate in the study were sent a link to the online survey. According to the frequency statistics, the demographic profile of the participants is as follows, in approximate numbers. In terms of age, 6% of the respondents were below 25, 48% were 25–9, 30% were 30–4, 7% were 35–9, and 10% were 40 and above. In addition, 53% of the respondents were female, while 47% of them were male.

The education level of our sample was high; 86% of the respondents had a bachelor's or master's degree. 39% of them worked in banking, 61% worked in telecommunications industry. In terms of the experience in the industry, 9% had less than 1 year of experience, 31% had 1 to 3 years of experience, 24% had 3 to 5 years of experience, and 36% had more than 5 years of work experience in their industries.

MEASURES

Organizational justice. Colquitt's (2001) justice scale was used in this study. Respondents were asked to rate about their ideas for the outcomes, procedures and interpersonal relations and information acquisitions in their workplaces on a 5-point Likert scale. The reliability of the overall scale had a 0.91 Cronbach's alpha value, and following Schmitt's (1996) suggestions, the sub-dimensions were also found to be satisfactory as well (procedural justice: $\alpha = 0.85$; distributive justice: $\alpha = 0.88$; interpersonal justice: $\alpha = 0.50$; informational justice: $\alpha = 0.91$).

Work stress. Employees' work stress was measured on a 16-item scale developed by Judge, Boudreau, and Bretz (1994). Respondents were asked to rate how much stress they produce while facing with

certain conditions in a 5-point Likert scale. The Cronbach's alpha value for this scale was 0.82.

Coping scale. In order to measure different coping styles of individuals, Şahin and Durak's (1995) adopted Turkish scale was used at first. However, after conducting a pilot study among 50 research assistants at a public university, it was found that most of the items of the scale needed to be deleted in order to increase the reliability value. As a result of this situation, Folkman et al.'s (1986) Ways of Coping Scale was translated to Turkish, abridged, and adapted. It was factor analysed and reduced to three dimensions including problem-focused, emotion-focused and social support-seeking coping mechanisms. In our version, there were 17 items at first but one of the items in emotion-focused coping was deleted because it lowered the reliability of the overall scale. All of the sub-dimensions had satisfactory reliability values ($\alpha = 0.81$; $\alpha = 0.78$; $\alpha = 0.78$ respectively).

The measures used in this study were taken from highly accepted questionnaires in the literature. Thus, validity and reliability of these measures were tested several times proving construct and content validity. Besides, as mentioned before, internal validity and reliability of proposed variables were found to be satisfactory.

Results

Correlations among the study variables can be seen in table 1. Consistent with the previous research and expectations, work stress is significantly and negatively related with overall justice and subdimensions of justice. Problem-focused coping mechanism is not significantly related with distributive justice; and emotion-focused coping mechanism is not significantly related with procedural and distributive justice dimensions. Moreover, problem-focused and social support-seeking coping mechanisms are positively related with organizational justice perceptions; while emotion-focused coping mechanism is negatively related. This preliminary analysis indicated that work stress and coping mechanisms are significantly related with justice perceptions of the employees.

In order to test the hypotheses, Multiple Linear Regression was employed. Detailed results of the regression analyses can be found in table 2. H1 was partially supported. Work stress and coping mechanisms explained 18.3% of the variation in overall justice perceptions, however adjusted R^2 stayed in 17% showing that some of the variables did not contribute much to the model. Work stress was negatively related with overall justice perception. Problem-focused coping and social support-seeking coping mechanisms were posi-

TABLE 1 Correlations among the Study Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	–							
(2)	0.68**	–						
(3)	0.75**	0.42**	–					
(4)	0.81**	0.41**	0.42**	–				
(5)	0.71**	0.40**	0.37**	0.61**	–			
(6)	−0.22**	−0.25**	−0.14*	−0.14*	−0.19**	–		
(7)	0.30**	0.28**	0.12	0.32**	0.30**	−0.07	–	
(8)	0.26**	0.19**	0.18**	0.26**	0.26**	0.11	0.26**	–
(9)	−0.15*	−0.03	−0.07	−0.20**	−0.19**	0.15*	−0.28**	0.11

NOTES Variables: (1) Overall Justice, (2) Procedural Justice, (3) Distributive Justice, (4) Informational Justice, (5) Interactional Justice, (6) Work Stress, (7) Problem Focused Coping, (8) Social Support Seeking Coping, (9) Emotion Focused Coping. ** $p < 0.01$; * $p < 0.05$.

tively related with overall justice perception. On the other hand, emotion-focused coping mechanism did not significantly contribute to the proposed model. In a similar vein, H2 also partially supported, since emotion-focused coping mechanism again did not significantly contribute to the model. Work stress was negatively related with procedural justice perception. Problem-focused coping and social support-seeking coping mechanisms were positively related with procedural justice perception.

The model testing H3 revealed that work stress and coping mechanisms only explained 6.5% of variation in distributive justice. This time, neither emotion-focused nor problem-focused coping mechanisms significantly contributed. Only, social support-seeking coping was positively related with distributive justice perception. On the other hand, work stress was negatively related with distributive justice perception.

Moreover, H4 and H5 related to informational and interpersonal justice perceptions yield similar results. Both informational and interpersonal justice perceptions were negatively affected by work stress and emotion-focused coping mechanisms, while positively affected by problem-focused and support-seeking coping mechanisms.

Discussion

The study aims to broaden the understanding about the role of work stress and coping mechanisms on the organizational justice perceptions of individuals in the workplace. Firstly, the effect of work stress

TABLE 2 Regression Results

Dependent variable	Independent variable	β	t	Sig.	R^2	Adj. R^2	F	Sig. (F)
Overall Justice	Stress	−0.21	−3.34	0.00	0.18	0.17	11.57	0.00
	Problem Focused Coping	0.20	2.85	0.00				
	Social Support Seeking Coping	0.25	3.67	0.00				
	Emotion Focused Coping	−0.09	−1.38	0.17				
Procedural Justice	Stress	−0.26	−4.02	0.00	0.16	0.14	9.80	0.00
	Problem Focused Coping	0.24	3.47	0.00				
	Social Support Seeking Coping	0.15	2.15	0.03				
	Emotion Focused Coping	0.06	0.94	0.35				
Distributive Justice	Stress	−0.15	−2.21	0.03	0.07	0.05	3.58	0.00
	Problem Focused Coping	0.05	0.69	0.49				
	Social Support Seeking Coping	0.19	2.64	0.01				
	Emotion Focused Coping	−0.05	−0.69	0.49				
Informational Justice	Stress	−0.13	−1.98	0.05	0.18	0.16	10.96	0.00
	Problem Focused Coping	0.21	3.02	0.00				
	Social Support Seeking Coping	0.24	3.51	0.00				
	Emotion Focused Coping	−0.15	−2.18	0.03				
Interpersonal Justice	Stress	−0.18	−2.76	0.01	0.18	0.16	11.21	0.00
	Problem Focused Coping	0.19	2.67	0.01				
	Social Support Seeking Coping	0.25	3.65	0.00				
	Emotion Focused Coping	−0.14	−2.1	0.04				

and coping mechanisms of problem-focused, emotion-focused and social support-seeking on overall perceptions of justice were examined. The results of the study have showed that work stress negatively effects overall justice perceptions of the employees. The findings of the current study are consistent with Zhang et al.'s (2014) study, which examined work stressors as predictors of organizational justice and strain. They found that both challenge and hindrance stressors are negatively and significantly related with organizational justice perceptions. As Fujishiro and Heaney (2007) proposed, justice appraisals and stress appraisals can be problematic to distinguish and are highly likely to influence one another. For instance, 'Once a situation has been appraised for stress, the stress appraisal itself may be appraised for justice by asking the question, "Do I deserve this much stress?"' Therefore, work stress can also effect the justice perception of the employees in a negative way (Fujishiro and Heaney 2007, 491). Also, problem-focused and social support-seeking coping mechanisms were found to be positively related with overall justice perception, while emotion-focused coping mechanism did not significantly affect justice perceptions.

Moreover, sub-dimensions of organizational justice were investigated in order to examine the separate components of the work environment. All sub-dimensions of organizational justice were negatively affected by work stress. As for coping dimensions, procedural and informational justice perceptions were found to be positively affected by problem-focused and social support-seeking coping mechanisms; while emotion-focused coping mechanism was not significantly related, again. These results are partly consistent with Nakagawa et al.'s (2014) research which postulated that problem-focused coping strategies have positive effects, while negative emotion-focused coping strategies have adverse effects on procedural justice perception. Also, contrary to the current study, seeking for social support as a coping strategy had no significant effect on the formation of procedural and interactional justice perceptions in the same study (Nakagawa et al. 2014). Resulting differences for the same constructs might have occurred due to cultural differences between the samples; even Japanese and Turkish cultures have some similar behavioural patterns. Another study conducted on a Western sample also provided results contradicting with this study. Lilly and Vrick's (2013) research showed that there is no significant relationship between avoidance or emotion-focused coping style and informational and interpersonal justice perceptions, while this study found a negative relationship between them.

Since informational justice is about being informed about certain situations in the workplace context and procedural justice is mostly related with the consistency and fairness of processes (Colquitt et al. 2001), trying to find a solution for a stressful event and getting the needed information for this stressful event from a co-worker or manager as a social support can be vital to consider the work environment as fair. In this study, interactional justice was touched upon along with its sub dimensions and analysed with other constructs separately. As a consequence, the results obtained from the current study suggested some different outcomes when compared to previous studies. It is important to assess the relationship of coping strategies and interactional justice dimensions in different organizational contexts, which have different levels of information flows or supervisory styles.

Apart from these dimensions, distributive justice perception was positively affected by social support-seeking coping mechanism, while emotion-focused and problem-focused coping mechanisms were not significantly related. Again, problem-focused and social support-seeking coping mechanisms were positively related with interpersonal justice perception; however, emotion-focused coping mechanism significantly and negatively affected this dimension. In parallel with the underlying mechanisms of informational justice perception, a supportive and explicative organizational context may reinforce interpersonal interactions and relationships. According to these results, work stress is highly effective on individuals' justice perceptions whatever the coping mechanism they use. Problem-focused and social support-seeking coping mechanisms were generally found to positively affect the overall justice and sub-dimensions of justice perceptions. Emotion-focused coping especially showed a different pattern in diverging sub-dimensions. Since it basically refers to avoidance and ignorance of the stressful situations, it may not be surprising that it has no significant or in some cases negative relationships with some of the organizational justice dimensions. Avoiding from the current problems may not influence an individual's perception of organizational justice, or avoidance may make the situation worse; but not better.

Moreover, the current study may help to provide better understanding about the reverse relationships of work stress and organizational justice constructs. Studies on work stress and organizational justice mostly assume that justice is the antecedent of stress, while the reverse might as well be true. It is conceivable that arranging variables such as dependent and independent for strict cause-and-

effect relationships may inhibit comprehension of the overall relationship network of organizational and behavioural constructs in organizational behaviour literature, as similar studies have suggested (Lilly and Vrick 2013; Nakagawa et al. 2014).

The study is not without limits. In the best-case scenario, stress and coping mechanisms explain only 18% of organizational justice perception. Thus, there are more variables than only stress and coping mechanisms in explaining justice perception of employees. Work environment characteristics can be more elaborately examined, and additional variables such as organizational culture/climate, ethical conduct in the workplace, and helping behaviour in organizational citizenship construct might be used to better understand organizational justice. Since justice is all about perceptions, emotions and affects can be added to the model as a moderator as well, in future research. Furthermore, the current research was a cross-sectional study that can only project limited perceptions and behaviours of employees. Longitudinal studies in different samples and environmental contexts may be more helpful in understanding the nature of reversed relationships among work stress, coping mechanisms and organizational justice perceptions.

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How Does Millennials' Perception on Their Employers Affect Their Work Ethic? A Study in Hong Kong

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Work ethic of millennial employees has raised considerable attention in Hong Kong. Current article examined how the millennials' perception on their employers would have an effect on their own work ethic. A survey study of 212 millennial respondents showed that the millennials in general perceived their employers positively and embraced good work ethic. Two variables – perception and work ethic – are significantly related. The study also revealed that millennials in Hong Kong hold peculiar interpretations of work and leisure, and of work and success. It was suggested that parenting, educational system, and modern working environments might have caused these interpretations.

Key words: millennial, work ethic, perception, psychological contract, Hong Kong

Introduction

In 2013, there were twelve local market studies conducted by non-academic consultancy firms in Hong Kong to study the employees. Five of them were related to work ethic and behaviors of the millennial employees. Similar researches among the local academia in Hong Kong have been rather deprived in the recent decade. Though it is generally recognized that the millennials, making up about 30 percent of the labor force in Hong Kong (Census and Statistics Department 2013), are better educated, more creative and possess greater potentials, they are also often negatively labelled and openly criticized by market studies in the social media in the recent years for being tardy, utilitarian and self-centered (CPD Alliance 2013). These studies, having gathered responses primarily from managers and employers, had largely neglected the views and perspectives of the millennials, and had reported conclusions that are mostly one-sided. Studies that gather the perspectives of the millennial generation can thus provide a more balanced evaluation of the millennial workforce and enhance our understanding of the possible antecedents towards the values and beliefs they hold at work.

This study therefore aims to gather the perspectives of the millennial generation to examine (1) the general work ethic of the millennials in Hong Kong and extend to adopt an exploratory approach to study (2) the relationship between their perception on their employers and their work ethic.

Work Ethic

Work ethic is a terminology used generally to describe the set of beliefs, values, and attitudes that an individual assumes during work (Meriac, Woehr, and Banister 2010). It is a reflection of an individual's dedication and commitment to work, and one's willingness to exercise effort over and above the threshold standards required and expected by a job (McMurray and Scott 2013). This terminology was originally created by post-reformation scholars who promoted individualism among society and discredited the welfare state (Miller, Woehr, and Hudspeth 2001). The scholars believed that individuals should be fully accountable for their well-beings in life and it is through hard work that any one individual could better his or her standard of living.

As the 'work ethic' terminology develops and evolves, its interpretation gradually collides with Max Weber's work about 'Protestant Ethic' (McMurray and Scott 2013). Making reference to the rationalization laid down by Weber, the ability to work and gain returns was considered to be an act of satisfying God's will and fulfilling the labor desired by God. The ethic in work resembles a kind of calling from the above and that individuals should work systematically and continuously to maximize the benefits of their labor and thus the glory to God (Miller, Woehr, and Hudspeth 2001). Weber's construct of Protestant Work Ethic (PWE) was theorized formally basing on religious faith and duty, holding onto beliefs and personal principles in the dimensions on centrality of work, self-reliance, hard work, leisure avoidance, morality, delay of gratification, and time utilization.

Nowadays, the modern understanding of work ethic does not confine to any single culture or religion (Geren 2011). Occupational work ethic covers a wide range of aspects and is culturally developed from a combination of the employees' family, religious, and ethnic beliefs and values (Petty and Hill 2005). According to Anca (2012), the concept of work ethic today 'stresses the importance of skills, discipline, challenge, autonomy, quality of work produced,' and positive work ethic aims to increase employees' productivity through the achievement of an optimal efficiency, mentality and position.

Perception on Employers

Among the organizational behaviorists, the debate as to whether work values and beliefs are affected by structure – which signifies recurring patterns that limit the available variations – or by agency – which considers individuals' ability to think and act independently to complicate structures – is still ongoing (Heugens and Lander 2009). Agency theorists tend to believe that the way individuals make sense of the environment can influence the individuals' beliefs and values (Ivancevich, Konopaske, and Matteson 2007). Therefore, an individual's perception – or one's cognition in meaningful interpretations of the environment – may influence their beliefs and values.

According to McShane and Von Glinow (2010), employees' perceptions of their employer and the working environment can greatly manipulate their work attitudes and beliefs. Over three decades ago, James Hayes (1977), the then president of the American Management Association, had already noted that organizational conditions and leadership play an important role in shaping the attitudes of the employees. The perception of the working environment they are introduced to when the employees report for duty on the first day would influence their willingness to extend themselves to ethical behaviors at work. This includes the consistency of the work ethic displayed by the leaders and the consistency of the working condition with what they have been told or promised for.

While literatures have frequently rested upon the social exchange concept whereby individuals' voluntary actions are motivated by the returns expected, motivational concepts like the equity theory developed by John Stacy Adams (1963) also appeared to be applicable to explain the employees' expectation for reasonable and ethical treatments by the employers and the organization before they display the similar level of desired work ethic at work. In more recent studies, psychological contract breach has often been named as the mediating factor for poor workplace ethical outcomes (Suazo 2009). As illustrated, the perceived organizational injustice at workplace would destroy the psychological contract between employees and the employer, and undermine the mutual trust and reciprocal exchange relationship between the two parties. This would lead to employees' retaliation in the form of holding on to less desirable work ethic at work.

Zribi and Souaï (2013) studied 340 Tunisian employees and argued that psychological contract break occurs from employees' negative evaluation of the fairness of the reciprocal expectations and obliga-

tions between employees and employers. The contract breaks when increasingly injustice organizational practices permitted by the employers have increased the frequency of deviant behaviors among the employees. Similarly, the study of Liu and Berry (2013) argued that organizational injustice can promote unethical workplace behaviors such as time theft. The relationship between perceived injustice and time theft is mediated by the morality and the equity sensitivity of the employees. Employees when perceived to be treated unfairly would be more likely to distort their moral judgments and engage in unethical behaviors. The perceived exchange relationship between the employers and the employees can consequently be used to predict the ethical positions of employees after subjecting to different treatments by the employers. Weaker feeling of attachment, lower sense of responsibility, and more deviant behaviors were observed in organizations where workers perceived their treatment by the employers and the organizations as substandard, unjust and unreasonable.

The Millennial Generation

In many Western countries, academic research has been actively conducted on the millennial generation and has reported that the millennials possess distinctive characteristics in their values, expectations, and behaviors at work (Costanza et al. 2012).

In terms of the perceptual aspects of millennials on their expectations of the organizations and their careers, studies agreed that the millenials place a significant interest in work-life balance (De Hauw and De Vos 2010), but findings revealed that these younger employees are willing to lower their expectations in less optimistic economic environment. The millennials, however, continue to expect highly on job content, training and development, and fair rewards in times of recession, especially in the availability of opportunities for personal career development in the organizations. Violation of these high expectations can lead to the perception of a psychological contract breach that may result in devastating outcomes in the employees' commitment, performance, and retention.

In terms of work ethic and work attitude across employees of different generations, small statistical differences are observed between generations when they are at the same age (Deal, Altman, and Rogelberg 2010). Some of these small differences include the slightly lower work centrality and slightly higher job satisfaction among millennial generation, but there is certainly no difference significant enough to be reported as a profound discovery (Kowske, Rasch, and

Wiley 2010). In general, the millennial employees possess weaker work ethic, believing that work is not so much the central element of life, placing greater value in leisure, demanding more freedom and work-life balance than previous generations (Twenge 2010). The millennial employees are more satisfied with their organizations and their jobs than older generations when valued and provided with opportunities.

As reported by Hershatter and Epstein (2010), the millennial employees appear to possess the following distinctive characteristics. Firstly, millennials prefer supportive environment that assures them with acknowledgement, reward, and career progression when they have made accomplishments. Secondly, millenials prefer clear structures. Thirdly, millennials place strong values on work-life balance and are likely to make career decisions which strike balances between job stability and healthy personal and professional life. Finally, milleninals have strong affiliation needs to the employers and desire personal relationships with supervisors. Overall, the millennials are more happy than other generations to confine themselves to existing organizational infrastructures, to work with technologies, and to collaborate and engage with people around them. However, the millennials also have strong needs to be valued, taken care of, and appreciated. The millennials can be remarkably loyal when organizations can provide individualized attention, supportive culture, and equitable framework to acknowledge and reward their efforts.

Based on review on literatures related to work ethic, perception on employers, and characteristics of millennials in the Western countries, this study positioned itself to examine the general work ethic of the millennials in Hong Kong and extend to investigate the relationship between their perception on their employers and their work ethic from an exploratory perspective.

Method

Sampling and Data Collection Procedures

A survey strategy has been adopted for this study to collect the necessary data from convenience samples. In this study, the millennial generation has been defined as those individuals who were born in the 1980s (also known as the 'post-80s' in Hong Kong) and the 1990s (the 'post-90s'), equating to individuals who are between 15 and 34 years of age inclusive in the year of 2014.

150 invitation emails were sent to students, alumni, and staff of secondary and tertiary education institutions who age between 15

and 34 inclusive and were conveniently accessible by the researcher through networking platforms and alumni systems of institutions. These individuals were given clear instructions to read the introduction and the ethical statements attached in the email before clicking on the hyperlink to the questionnaire. Therefore, respondents to the questionnaire were fully aware of the voluntary basis of their participation, and that information collected in the survey exercise would be kept confidential from third parties. Upon completion of their questionnaire, respondents were urged to invite more friends of theirs who age between 15 and 34 inclusive to participate in the study.

To prevent possibility of repeated entries by the same individual, the respondents' IP address were recorded as they completed the questionnaires. Responses from the same IP address were barred. Although there was still possibility that a respondent repeatedly accessed and completed the questionnaire on multiple electronic devices, the chances of such action were low since no financial incentives were given to the respondents on completing the questionnaire – not to mention an additional one.

By the closure of the survey exercise, a total of 226 web-based electronic questionnaires were completed. Out of the 226 completed questionnaires, 8 respondents do not possess any current or prior work experience and 6 respondents fell outside the age range of 15–34, and therefore these 14 responses have been excluded from the sample data set. In the end, 212 responses were usable for research data analysis.

INSTRUMENTS

Questionnaires were distributed to the respondents to collect their self-evaluated work ethic and their perceptions on their employers together with other demographic information. The questionnaire is designed with standardized questions to solicit easily quantifiable answers. Most respondents should be able to complete the questionnaires within 15 minutes.

For measurement of the respondents' work ethic, the 19-item Protestant Work Ethic (PWE) scale (Mirels and Garrett 1971) was adopted in this study because the PWE scale has been used by many other related studies in the last decade (Dunn 2013). In additional to the 19 items from the PWE scale, three more items were re-worded from the list of employees' duties described by Crane and Matten (2007), namely duty to comply with labor contact, duty to comply with the law, and duty to respect the employer's property, to measure

the sense of moral duties and work obligations held by the respondents. In total, there were 22 items measured on work ethic in my questionnaire based on the Likert scale between 1 and 7. Low scores would mean lower work ethic possessed by respondents whereby high scores would mean higher work ethic possessed by respondents. The internal reliability of the scale was 0.828.

For measurement of the respondents' perception on their employers, the measuring items are obtained from the list of employees' rights from Crane and Matten (2007) and re-worded to ask for respondents' view on how far do they think their employers have fulfilled their employees' rights through organizational practices in the current study. The list of employees' rights include right to freedom from discrimination, right to privacy, right to process, right to participation and association, right to healthy and safe working conditions, right to air pay, right to freedom of conscience and speech, and right to work. The items are measured with the Likert scale between 1 and 7. The internal reliability of the scale was 0.890.

Results

Table 1 summarizes that distribution of the demographics of the respondents. There was a disproportionate distribution of respondents who were born in the 1980s and the 1990s. There were more respondents who were born in the 1990s in this study. This outcome was an expected outcome and limitation of convenience sampling, and it was acceptable in this exploratory mini-scale study. The other demographics relating to gender, educational attainment, and work experience have shown fair and reasonable distribution among the respondents.

Table 2 summarizes the mean and the standard deviations of the respondents' perceptions on employers' ethic. On a Likert scale between 1 and 7, the average scores for employees' perception on employers' ethic range from 1.00 to 6.63, and the mean of the average score is 4.15. This shows that the post-80 and post-90 employees are likely to perceive their employers in the positive manner and believe that their employers have fulfilled employees' rights in their workplace. The close gap between the mean total score (4.15) and the central value of the score (4.00) implies that the employees' positive belief on employers' ethic – though inclined to be optimistic – remains weak among the millennial respondents.

Looking at the scores corresponding to the different employees' rights, respondents believe that their employers are ethically fulfilling their right to healthy and safe working conditions (4.52), right

TABLE 1 Summary of Respondents' Demographic Data from the Questionnaire

Category		Frequency	Percentage
Age	15–24	161	75.9
	25–34	51	24.1
Education	Secondary	14	6.6
	Sub-degree	94	44.3
	Bachelor	91	42.9
	Postgraduate	13	6.1
Gender	Male	117	55.2
	Female	95	44.8
Work Experience	1 year or less	81	38.2
	1 to 5 years	92	43.4
	5 years or more	39	18.4

TABLE 2 Summary of Respondents' Perception Data from the Questionnaire

Item	(1)	(2)
Right to freedom from discrimination	4.33	1.351
Right to privacy	4.17	1.365
Right to process	3.99	1.457
Right to participation and association	3.72	1.413
Right to healthy and safe working conditions	4.52	1.368
Right to a fair pay	4.00	1.429
Right to freedom of conscience and speech	4.38	1.546
Right to work	4.12	1.444
Respondents' perception on employers' fulfillment of employees' rights	4.15	1.069

NOTES Column headings are as follows: (1) mean, (2) standard deviation.

to freedom of conscience and speech (4.38), right to freedom from discrimination (4.33), right to privacy (4.17), and right to work (4.12). Respondents' perception of the employers' ability to fulfill their right to fair pay (4.00) is a tie struggle neither believing nor disbelieving. Respondents, however, disbelieve that employers fulfill the employees' right to participation and association (3.72) and right to process (3.99). Again, the differences between the mean values and the central values are small and thus this disbelief remains weak in general.

Table 3 summarizes the mean and the standard deviations of the respondents' self-reported work ethic scores. The mean scores of work ethic among the respondents range from 2.65 to 5.81. The mean total score of all work ethic items is 4.34 and this indicates that millennial respondents generally hold positive work ethical beliefs and values. The small standard deviation of 0.66 implies that the scores

TABLE 3 Summary of Respondents' Work Ethic Data from the Questionnaire

Item	(1)	(2)
Employees' duties		
Duty to comply with the law	5.17	1.357
Duty to respect the employer's property	4.59	1.400
Duty to comply with labor contact	4.62	1.235
Protestant work ethic		
Most people spend too much time in unprofitable amusements.	4.15	1.529
Our society would have fewer problems if people had less leisure time. (Reversed)	3.10	1.538
Money acquired easily (e.g., through gambling or speculation) is usually spent unwisely.	4.80	1.630
There are few satisfactions equal to the realization that one has done his best at his job.	4.81	1.426
The most difficult college courses usually turn out to be the most rewarding.	4.43	1.486
Most people who don't succeed in life are just plain lazy.	4.56	1.627
The self-made man is likely to be more ethical than the man born to wealth.	4.72	1.481
I often feel I would be more successful if I sacrificed certain pleasures.	4.76	1.448

Continued on the next page

cluster around the mean and that majority of the millennial respondents reported ethic scores near the mean total score and possesses positive work ethic.

Segregating the 22 work ethic measurement items into two, 19 of them are items from the Protestant Work Ethic (PWE) scale and the remaining three are rephrased from the list of employees' duties. The means of the PWE scores range from 2.48 at minimum to 5.78 at maximum and the mean total score for the PWE items is 4.28. This lower mean score among the 19 items as compared to the mean of the aggregated 22-item measurement shows that millennial respondents carry a slightly weaker PWE-associated moral belief on working hard over taking leisure.

The respondents score highly in 'any man who is able and willing to work hard has a good chance of succeeding' (5.00), 'the credit card is a ticket to careless spending' (4.93), 'there are few satisfactions equal to the realization that one has done his best at his job' (4.81) and 'money acquired easily is usually spent unwisely' (4.80). This implies that the respondents in general appreciate and believe in the ethic to work hard and do one's best at work, and that the respondents do not agree with unwise spending of money

TABLE 3 *Continued from the previous page*

Item	(1)	(2)
People should have more leisure time to spend in relaxation. (Reversed)	3.61	1.630
Any man who is able and willing to work hard has a good chance of succeeding.	5.00	1.473
People who fail at a job have usually not tried hard enough.	4.00	1.431
Life would have very little meaning if we never had to suffer.	4.61	1.493
Hard work offers little guarantee of success.	3.75	1.367
The credit card is a ticket to careless spending.	4.93	1.541
Life would be more meaningful if we had more leisure time. (Reversed)	3.73	1.398
The man who can approach an unpleasant task with enthusiasm is the man who gets ahead.	4.15	1.336
If one works hard enough he is likely to make a good life for himself.	4.43	1.431
I feel uneasy when there is little work for me to do.	4.08	1.480
A distaste for hard work usually reflects a weakness of character.	4.34	1.359
Respondents' agreement to their own duties at work	4.79	1.008
Respondents' Protestant work ethic score	4.28	0.659
Respondents' aggregated work ethic score	4.34	0.662

NOTES Column headings are as follows: (1) mean, (2) standard deviation.

that has been obtained via occasional luck or utilization of credits.

A closer look at the 19 PWE items, there are four items scoring below 4 out of 7-point Likert scale, which are 'our society would have fewer problems if people had less leisure time,' 'people should have more leisure time to spend in relaxation (reversed),' 'life would be more meaningful if we had more leisure time (reversed),' and 'hard work offers little guarantee of success.' The former three items are concern with the attitude towards leisure and the results indicate that post-80 and post-90 respondents do not consider leisure time or more relaxation as a hindrance to hard work (3.10, 3.61, and 3.73). As for the last item which evaluates the respondents' belief in the linkage between hard work and success (3.75), this finding reveals that millennial respondents in Hong Kong believe that their hard work can lead to success in their work or careers, and again confirms that the millennials generally agree to the idea of hard work as a work ethic or work virtue.

As for the respondents' ethical belief in fulfillment of their own employee work duty, the mean of the three duty items range from 2.33 to 7.00. The mean total score of the three duty items is 4.79

TABLE 4 Cross-Tab Analysis by Perception Groups

(1)	(2)	(3)	(4)
Positive (above 4)	5.17	4.56	4.63
Negative (below 4)	4.30	3.91	3.95
Relative difference (%)	18.60	15.38	15.78

NOTES Column headings are as follows: (1) respondents' perception on employers' fulfillment of employees' rights, (2) respondents' agreement to their own duties at work, (3) respondents' Protestant work ethic score, (4) respondents' aggregated work ethic score. The neutral group with perception mean equals to 4 has been omitted in this table. Relative difference is calculated by dividing the difference of the two means by the average of the two means. Relative difference = $(m1-m2)/((m1+m2)/2)$.

which is higher than the mean total score of all 22 work ethic items. This shows that millennial respondents generally accept that it is their duties to comply with the law (5.17), comply with the labor contract (4.62), and respect the employers' property (4.59) at workplace. But when comparing the mean total duty score (4.79) and the mean total PWE score (4.28), these millennial respondents more recognize their rightful duties at work and less recognize with the PWE that working hard should be placed over taking leisure.

Table 4 is a cross-tab analysis conducted by segregating the perception data into smaller groups and the corresponding work ethic scores between the perception groups are compared against one another. The cross-tab analysis results showed that respondents with positive perception on their employers in general possess higher work ethic (4.628), while those with negative perception on their employers hold lower work ethic (3.951). The relative differences of means for the duty items, PWE items, and the aggregated work ethic measurement between the positive and negative groups are significantly above 10% at 18.6%, 15.4%, and 15.8% respectively. This clearly demonstrates that the employees' perception on their employers' ethic can influence the work ethic that they hold, both in terms of their beliefs in the needs to fulfill employees' duties and in the way they identify with the need for hard work. Since perception can influence ethical beliefs, millennial employees who perceive their employers in a better way may appear to possess more acceptable work ethical beliefs, fulfill employees' duties more duly and value the importance of hard work to a greater extent.

Analysis of the correlation and the significance shows strong positive relationship between employees' perception on employers' ethic and employees' work ethic, $r(212) = 0.540$, $p < 0.001$, two-tailed. The extremely small p value means that the likelihood that the result is

TABLE 5 Correlation Analysis between Perception and Work Ethic

Pearson Correlation	EmDuties	PWE	WorkEthic
	0.535**	0.506**	0.540**
Regression	B	Beta	Sig
	0.334	0.540	0.000**

NOTES **Correlation is significant at the 0.01 level (2-tailed).

due to chance is very low. In other words, the relationship between these two variables is very likely to exist. Simple regression analysis was further conducted to investigate how well employees' perception on employers predicts the employees' work ethic. The results were statistically significant $F(1, 210) = 86.23$, $p < 0.001$. The adjusted R squared value was 0.288 and this indicates that 28.8% of the variance in employees' work ethic was explained by employees' perception on their employers. Accordingly, the regression analysis further confirms the direction of the relationship in which employees' perception on their employers is statistically a significant predictor for employees' work ethic.

From the descriptive analysis and the results of the correlation and regression analysis, millennial respondents in the current study generally carry positive perception on their employers, believing that their employers have fulfilled ethical obligations at work to protect employees' rights at workplace. Majority of the millennial respondents also possess positive work ethic. Furthermore, the millennial employees' perception on employers appears to be related to their work ethic.

Discussion

This study aimed to examine the general perception of the millennial employees on their employers and the millennial employees' work ethic in the Hong Kong context, and further extend to investigate the relationship between their perception on their employers and their work ethic from an exploratory perspective. Indeed, the millennial respondents in the current study do not see themselves as negatively as described by the market studies or the social media. Results from the descriptive analysis in the current study agreed with the literature that the millennials do have distinctive characteristics in their values, expectations, and behaviors at work.

MILLENNIAL EMPLOYEES' PERCEPTION ON THEIR EMPLOYERS

Millennial employees were found to have a generally positive perception on their employers. They consider their employers to be

ethical in fulfilling the employers' obligations to safeguard the different employees' rights at work. These millennial employees are not antagonistic towards their employers, most of whom are from older generations. They do not have many grunts and complaints against their employers. Many post-80 and post-90 employees see their employers as ethical individuals and are able to appreciate the employers' effort in ensuring the provision of healthy and safe working conditions, freedom of conscience and speech, freedom from discrimination, privacy, and fair recruitment and selection procedures at work.

Certainly, the genuine acknowledgement by the millennial employees on their employers' effort in fulfilling employees' rights could be a reason for the positive perception results obtained in the current study. Another possible reason could be due to a cultural disposition in an Asian society. Individuals in Asian society usually possess higher agreeableness trait (Allik and McCrae 2004), associating with personality characteristics of being kind, sympathetic, considerate, warm, helpful, pleasant, trustful, cooperative, and agreeable (Saucier 1994). Socializing activities in Asian nations therefore favor subservience, humility, and preservation of harmonious relationships between people (Hamid 1994). The millennial generation having brought up by the previous generations in the Asian society, resided in the Asian cultural environment, and cultivated by educators of the previous generations under Asian values may have been shaped to possess the agreeableness characteristic. Throughout the growth of the millennials, they may have been encouraged to develop and maintain close relationships with peers, seniors and superiors at home and in school (Hershatter and Epstein 2010). They are thus more willingness to show kindness, cooperativeness, and acceptance to their peers, seniors and supervisors at work.

The positive perception of the millennial respondents on their employers may therefore be a result of the millennials being more agreeable and willing to accept organizational practices that are not too bad after all. Even though some employers may not have fully satisfied the millennial employees' demand for a symbiotic relationship, these millennial employees may still hold a positive and congenial feeling towards the employers because they are more agreeable. They prefer to perceive the organization under more optimistic and friendly lens so that they can enjoy a more harmonious working environment and supportive interpersonal relationships with their employers.

MILLENNIAL EMPLOYEES' WORK ETHIC: WORK AND LEISURE

Millennial respondents in the current study in general possess good work ethic, believing that it is important to work hard and fulfill their duties as employees. This opposes to the connation among the society as described in the background of the dissertation that millennial employees possess weak work ethic (CPD Alliance 2013).

However, when time is concerned, millennial employees tend to hold a significantly different ethical belief in which they value leisure at a similar level to work. Millennial respondents appear to hold looser interpretation to the concept of work and leisure. Accordingly, the leisure work values do not only limit to non-office hour rest time or vacation time, but also extend to work perspective in seeking for allowance to work at a slower pace under less restricted duration and environment (Twenge 2010). The current research found that millennial employees do not consider taking leisure time as obstructing or opposing to working hard. In contrast to the Protestant Work Ethics in which hard work and less leisure is preferred, the post-80 and post-90 employees appear to view work and leisure more on par. They do not think that leisure and work are mutually exclusive and they do not believe that leisure is a hindrance to work. In fact, they are more inclined to consider both leisure and work can co-exist and that taking reasonable leisure does not necessarily equate to second-placing the importance of hard work. In other words, these millennial employees simply take a more balanced view on work and rest.

The millennial respondents' mentality for more leisure and balanced work-life is in conjunction with the findings from other oversea studies that the millennial generation places greater emphasis on work-life balance and would value leisure more compared to people from earlier generations (Deal, Altman, and Rogelberg, 2010; Kowske, Rasch, and Wiley 2010). As Hershatter and Epstein (2010) argued, this mentality may be developed from social learning as the millennials observed throughout their growth when their parents prioritized corporate success over work-life balance and sacrificed their time spent with the family, leaving many of the young millennial kids in childcare or at home most of the time with their household assistants. Having those unfavorable past experiences, the millennials believe stronger in the need for more balanced and flexible working arrangement so that they can spend more valuable moments with their family members and friends which constitute important aspects of their lives.

Of course, managers and employers might argue that the millennials are less hard-working. However, literatures suggested that the different work ethical beliefs on work and leisure may have been resulted from contextual reasons. With the immersion of digital and information technology in the current era, the border between professional and personal life becomes less concrete (Hershatter and Epstein 2010). The segregation between work and leisure becomes more ill-defined because employees may be required to attend to emails or instant messages during non-office hours. Even though the official working hours have not increased significantly over generations, mobile and digital technologies enable employers to reach their employees almost anytime and anywhere (Deal, Altman, and Rogelberg 2010). The situation is even worse in Hong Kong because the average annual working hours for employees in Hong Kong have topped the world at 2,606 hours per year as described in the Prices and Earnings 2015 report (Union Bank of Switzerland 2015). This is equivalent to employees working nearly 50 hours per week, 10 hours per day assuming a 5-day work week. Employees feel 'as if they are never off the clock.' In order to achieve the balance in work and leisure, it is therefore not surprising to find millennial employees adopting similar mentality and morality in their actual work behaviors within organizations.

Referring back to the questionnaire findings, the millennial respondents believe that 'people should have more leisure time to spend in relaxation' and 'life would be more meaningful if we had more leisure time.' They do not agree that 'our society would have fewer problems if people had less leisure time.' Ultimately, these millennials displayed the work ethic in observable behaviors possibly in the form of taking more breaks and rests than acceptable and daydreaming at work. Thus, it is not surprising to see managers and employers, looking at the millennial generation under their own lens, complained about the millennial employees for being tardy, utilitarian and self-centered, and lacking discipline and sense of responsibility (CPD Alliance 2013).

Millennial Employees' Work Ethic: Work and Success

From the current study, the millennial respondents believe that hard work can lead to success, but are contradictorily disbelieving in their employers in the provision of right to process (3.99) for job promotion and progression. The millennial employees doubt that employers have given sufficient career advancement opportunities to those who work hard and put in much effort at work.

Overseas studies have noted that the millennial generation has higher expectations for career advancement than previous generations (Deal, Altman, and Rogelberg, 2010; Kowske, Rasch, and Wiley 2010). Having brought up under an education system packed with frequent assessments and quantifiable feedback (i.e. marks or grades), the millennial employees lack self-confidence and security when they do not receive similar assessment and feedback mechanism in the working environment. Among the Asian organizations, the feedback could be more qualitative in nature where modest and conservative comments are provided instead of the numbers, grades, or ranks desired by the millennial generation. The inability to clearly evaluate their own performance against the organizational standards and against other colleagues creates confusion and frustration among millennial employees who desire to know how and where they stand in the department or in the whole organization.

These millennials thus demand for clear instructions and feedback to their working tasks, and more transparent structures and systems within the organization to measure and reward performance (Hershatter and Epstein 2010). They wish to know if they are good enough for consideration on promotions. It is likely that because of the conflicting between the perception on employers and their work ethic among the millennials on the idea of hard work and progression, the millennials are constantly looking for very well-defined expectations and criteria for performance and promotions. Therefore, highly structured systems and clearly defined outlines can serve to ease the millennials' sense of insecurity in grasping success through hard work, and enhance retention of talented millennials within the organizations.

Relationship between millennial employees' perception and work ethic

Results confirmed strong relationship between the millennial employees' perception of their employers and the millennial employees' own work ethic. These two variables are of similar construct – the former one is the respondents' perception on the employers' fulfillment of responsibilities which is a form of evaluation of the employers' ethic, while the latter is the respondents' self-reported work ethic. Their relationship may be explained by the equity theory (Adams 1963), which looks at the perceived fairness in a social exchange. The work ethic of employees may be viewed as a reciprocal return of the employers' ethic.

As Zribi and Souaï (2013) illustrated, the sense of equity or the

psychological contract between employers and employees is developed in a way that reciprocal relationship is pursued by the two parties to balance the expectations and obligations of one another. When employers are expected to remunerate the employees, the employees are obligated to perform. Vice versa, when employees are expected to protect the organizational interest, the employers are obligated to protect the employees' interest. De Hauw and De Vos (2010) also noted that millennials are in general more understanding to the employers and less focused on the contract breach when the organizations are open and honest, for example to explain their positions of limited resources and to discuss other less costly arrangements to satisfy the employees' professional developmental needs.

When the employees believe that the employers are work ethical, the employees are then more willing to adopt similar level of work ethic to uphold the fair relationship in the social exchange. This may be a convincing explanation as to why the millennial employees' perception of their employers' ethic can be used to predict the millennial employees' own work ethic.

Limitations and Future Research

Given the scale and the nature of this research study, there are several limitations to be recognized. Firstly, this study utilizes the chain-referral sampling technique which is a non-probability sampling approach. The information collected is therefore subjected to questionable generalizability and challenges to external validity (Saunders, Lewis, and Adrian Thornhill 2009). Readers should be cautioned when trying to generalize the findings of this research to the larger population of the millennial group in Hong Kong. Despite so, the researcher has put in substantial effort in ensuring that the sample consists of respondents who have worked in a broad range of industry with different educational backgrounds to increase the variations in the sample. Secondly, the small sample size of 212 compared to the large sample population of over 1.4 million individuals belonging to the millennial group in Hong Kong, the number of participants of the study is suboptimal, or even too small a percentage of the total sample population. This again raises concerns on the external validity of the reported findings in terms of the generalizability of the conclusion made. Thirdly, the use of questionnaire as a method of data collection may constitute to biasness. For any self-report study, the participants may exaggerate or under-report certain responses in the questionnaires due to various biasness such as positive skew, central tendency, social desirability, primacy and recency, and others.

This may create another construct validity concern. Finally, the use of questionnaire surveyed at a particular point of time has limited the information collected to a specific static instance of time. Information collected may differ at a different instance but there is no way to account for those differences when only static field study is conducted.

With these limitations, future research can attempt to use a larger sample with probability sampling. This can provide more accurate and solid verifications to the findings in the current study, and strengthen the generalizability of the results. Additionally, qualitative components may be explored and integrated in future studies to provide greater insights to the rationales of the phenomena and relationships observed in the current study. Future studies can also encompass a larger duration of time to conduct longitudinal studies on the millennial generation to examine if work ethic will change as they age. Generational studies can also be conducted in which comparisons are drawn from employees of different generations to inspect if any generational differences exist among the workers in Hong Kong or in Asian societies.

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Academia-Industry Nexus Management

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The aim of this study is to discuss the importance of co-operation and separation between academia and industry. The academia-industry partnership is a feasible factor that affects innovations with students' transition to the job market. The empirical material was collected and analysed on the basis of data gathered by Slovene Human Resources Development and Scholarship Fund. The data applies to several academic-industry network projects founded by the aforementioned organisation. The case study of the survey outlines four project cases conducted by Faculty of Business, Management and Informatics. The results reveal exercises to exchange expertise and experience, helping the industry to become more competitive whilst offering students better employability and career prospects.

Key words: academia, industry, innovation, case study

Introduction

To look ahead, to be farsighted, to be creative, to win, to solve problems, to be efficient - all this concepts are in close relation to the COOL society in which we live (Srića 2016). Consumers are more aware of the new possible means of acquiring goods. Nowadays, transactions can be completed almost instantly using an internet application. Consequentially, companies are aware that it is necessary to develop relevant services that are adapted to the modern consumer. Firms have to be able to offer unique contents in comparison to their competitors. Due to different implementations, they represent an added and compelling value (Rudy and Johnson 2016). With the development of the four projects, we wanted to incorporate the contemporary characteristics of modern society, the nexus between academia and industry (Bartunek and Rynes 2014). This study follows previous studies on the academic and practitioner relationship of Bartunek and Rynes (2014). Business research often bears little

resemblance to business practice. Although this academic-industry gap is widely recognized and frequently lamented, there is little debate about how it can traverse (Bansal et al. 2012; McInerney 2015; Bartunek and Rynes 2014). But the topic is more than relevant at present times.

Moreover, an effective collaboration between academics and companies is essential for nexus in management (Bansal et al. 2012). Primarily, it can motivate a research theme relevant to trade. Secondly, it encourages implementation of fact-findings (Bartunek 2014). However, conducting collaborative research is not always easy.

Modern higher education initiate spectrum of competences to the students. The competences students can achieve during their studies. In this article we introduce four projects that students are involved with in order to achieve relevant job market competences (Gnanlet and Khanin 2015). The objective of the paper is to introduce the partners that they are involved with in academia-industry nexus (Bansal et al. 2012). We present the case study (Slaughter, Archerd, and Campbell 2004) of academia-industry partnership in Slovenia.

To the best of our knowledge, there has not been any previous publication that focuses on this topic for Slovenia. Additionally, there is scarce debate about this topic (Bansal et al. 2012). Moreover, we discuss the benefits, working conditions, time dimensions (Bartunek and Rynes 2014), project methods and results of the four projects conducted by the Faculty of Business, Management and Informatic (FBMI). The foundation partner involved is the Slovene Human Resources Development and Scholarships Fund (SHRDSF).

This article provides an academia-industry nexus management based on a literature review (Mawdsley and Somaya 2016). The case study (Bartunek and Rynes 2014; Bhaskar 2008; Heinonen 2015) with students, business executives and the academicians involved (Müller et al. 2013) hand out. Much of the research deals with the business's perspective. Usage of the third sector and non-profit management methods are a relatively new field of research (Schiller and Almon-Bar 2013), but not included in recent research yet.

The paper is structured as follows: in the next section (section two), we review literature on academia-industry partnerships to derive similarities and differences. In section three, we describe our methodological approach before (in section four) we analyse and discuss current trends based on empirical insights. The paper concludes by providing implications and suggestions for future research (section five).

Literature Overview

Higher education institutions are going through turbulent times (European Commission 2014). Hitherto have the expectations of their potential contributions (Selsky and Parker 2005), conceptualization (Molly, Ployhart, and Wright 2011), teaching methods and syllabus (Cabantous and Gond 2014; Myers, Hill, and Harwood 2005) been so high. Simultaneously, doubts concerning the quality and execution of higher education institutions have never been so critically evaluated or universal (European Commission 2014; Lee 2014). Three different approaches would be required to study academia management (Bansal et al. 2012; Bartunek and Rynes 2014; Mawdsley and Somaya 2016; Selsky and Parker 2005).

Firstly, students and academicians can achieve independently, e.g. from internationalization (Biloslavo and Panjek 2011) and mobility (Mawdsley and Somaya 2016; Flander 2011) in academia. In a recent study, Gričar and Neary (2016) introduced prospects of student and staff mobility and the consequences of internationalization based on semi-structured interviews. The results demonstrated slight nuances between student and staff perspectives. The new paradigm in the European Union (EU) is that students who went abroad will be employable and suitable to become employers in Europe (Li and Lowe 2016). Alternatively, students studying at higher education institutions in their home country will gain lower skills and may be forced to search for jobs without the specified skills. Differences are also evident between languages and cultural determinates which generate the ability to understand the path to broader thinking (Gričar and Neary 2016).

Secondly, academicians should be inter-sectorial mobile (Choi and Tang 2016). As modern science fundamentally requires team effort, inter-sectorial collaboration (Selsky and Parker 2005) should be rewarded as stated by the European Commission (2006). Internal academic and career appraisal systems, as well as performance indicators, are essential to encourage researcher mobility, claim experts (Mawdsley and Somaya 2016). Good grades now mean better career prospects later on. Collaboration can also be one of the criteria taken into account when appraising institutions and academicians. Prizes and awards are another way of repaying the more upwardly-mobile scientists in cases of individual excellence (European Commission 2006).

Incentives for better working and salary conditions should be provided through inter-sectorial (also related to international) mobility

through internal academic appraisal systems. However, inter-sector mobility should not be enforced (Selsky and Parker 2005). Criteria for appraising inter-sectorial mobility should be linked to the benefit of the host institution, the researchers' group, or the individual academicians. Examples of criteria are: co-publications with the business executive partner (publications are important for industry reputation), list of contacts, launching of cooperation projects, commercialisation, and start-up or spin-off experience even for failures (Lee 2014).

Thirdly, we shall discuss academia-industry (management) nexus (McInerney 2015). Recent literature concerning this nexus (Bansal et al. 2012; Bartunek and Rynes 2014; Mendoza 2014) starts with a brief overview of the historical developments leading to the knowledge economy. Subsequently, this section offers a critical review of the literature primarily published on academia-industry management nexus. European higher education institutions have developed into a complex academic environment in which individuals and organisations increasingly compete for material, human and symbolic resources (Mendoza 2014; Lee 2014).

Mendoza (2014) investigates industry-academia linkages with particular attention on conceptualizations for future investigations. Higher education struggles to balance its public mission with market pressures to remain competitive. Whilst competition spurs institutions towards efficiencies, too much drives assignment out of their decision making (Bartunek and Rynes 2014; Slaughter, Archerd, and Campbell 2004).

The boosters argue that academia-industry management nexus are useful to transfer academic research to society and aid academia by having a socially relevant impact (Roessner et al. 2013; Philips et al. 2015). Boosters worry that such nexus dwindle basic academic work, knowledge for the purpose of knowledge, as well as free interpretation (lay out) of findings (Slaughter, Archerd, and Campbell 2004). In our recent study we have adopted intermediate positions around notations of complementarity and differentiated boundaries supported in the literature by Szelenyi and Bresonis (2014). There are surveys to explain how knowledge from the investigation flows among and between project managers and project management office members (academicians), using a mixed-method approach (Müller et al. 2013).

The academia-industry nexus is one of the most captivating, productive, and important networks in business discovery and development, albeit not always harmonious (Molly, Ployhart, and Wright

2011). The latter is an example from the natural sciences (Sanchez-Serrano 2011). The impact of academic findings has governed every aspect of business development, from the initial identification of targets to the understanding of economic and knowledge pathways of students, academicians and business executives. Consequentially it may be surprising that despite the great productivity of the academia-industry relationship, interaction between academia and industry in recent years has been under attack (Sanchez-Serrano 2011; Bansal et al. 2012). The authors explore these important issues as part of this paper and launch a case study to improve this and following nexus. Since the middle- to late-1800s, business has had an extremely close nexus with academia (Sanchez-Serrano 2011).

Without the chemical, physiological, and biological academic discoveries that have taken place in Europe throughout the 18th and 19th century, the pharmaceutical industry would never have come into existence. In times of service, there is need for co-productive academia-industry nexus in the service economy for innovations and for higher gross domestic product (GDP). The latter appertain even colossally for developed and East European countries (Mihók et al. 2015).

Slovenia should take a path of Western counties (Mihók et al. 2015) whilst launching the benefits for innovations and higher GDP (Juselius 2009). Since the industry's early years, when universities in France, Britain, and particularly Germany (followed by universities in the United States) provided the industry with a massive prosperity of expertise and innovation that were translated by an industry into products and more recently into services. The impact of academic discoveries has enormous influence on new products and services (Sanchez-Serrano 2011).

Scientific collaborations between academia and industry have a long history in the United States and in other countries, reported Haller (2014). The ethical pitfalls of scientists and their patents dealing directly with industry stimulated much public discussion as studied by Haller (2014). This evolution is discussed, and recent developments with models of possible productive collaboration and rules are engaged.

Other authors also analyse aspects of nexuses with academia. Kamitani et al. (2013) analyses government-industry-academia collaborations in Japan from the view point of compatibility and motivating factors to collaborate among partners. The strategic motivation is not directly related to government-industry-academia collaboration outcomes, but rather the leadership of government that

is essential towards the results. Saguy's (2013) percept to academia-industry nexus is innovation. A review of the literature (Misterek and Lewicka 2014; Saguy 2013) demonstrates that innovation may be defined in various ways. This is including its narrow technological aspect and wider capture considering organizational and process changes in companies. Innovation is the application of a new: idea, invention, technology, model, or process to a product or service that satisfies a specific consumer need and can be replicated at an economical cost (Heinonen 2015). Innovation creates value and plays a vital role in growth and social well-being (Saguy 2013). Innovation contributes to economic growth (Karasek and Dermol 2015).

The motivation of our research comes through the four projects made in academia-industry nexus management over the past two years, e.g. 2014 and 2015 (see http://pkp2.altervista.org). Projects were formed at the FBMI. The organization was a project carrier. The purpose of the paper is to induct increasing academia-industry collaboration into economy and management (McInerney 2015). The first objective of the paper is to present an overview of the literature. The second is to provide a case study of recent academia-industry nexus.

Methodology and Data Collection

Mounting economic coerce, environmental provocations, diminishing resources, the exponentially accelerating pace of science and knowledge development, and the proliferation of open innovation call for a resume estimation of academia-industry relationships. Fundamental research as the sole power of academia is not extensively sustainable. Time is precious, it is our responsibility to provide leadership, conviction, to encourage and embark upon this journey to stimulate efforts and institutionalize innovation (Haller 2014; Saguy 2013).

An explanatory case study was conducted to understand the comprehension flows between academia members (students, academicians) and business executives. The underlying philosophical standpoint is critical realism (Lawson et al. 1998, Bhaskar 2008) whereby an underlying objective reality is assumed through the mechanics of project structures, giving rise to events of management These in turn encourage to the subjective reality of experiences, such as knowledge exchange within the project management community (Müller et al. 2013).

An embedded case study approach design with a multiple unit of analysis was used for this study (Yin 2009). A sequential mixed

method approach (Teddlie and Tashakkori 2010) primarily allowed for a qualitative study to understand the organization of projects and its structures, processes, roles, and responsibilities, especially in terms of the project management community; Secondly, for subsequent developments of findings across an entire study. A social network is hereby defined as a specific set of links amongst set persons, with the additional property that the characteristics of these linkages as a whole may be used to interpret the social behaviour of the persons involved (Müller et al. 2013).

Data collection was conducted through a created case study database. The roles of written databases are case study notes, documents, tabular materials and narratives. All the documents are made available upon request. All documents are saved in the cloud.

Academicians of the following higher education institution were involved: FBMI. Students of the following higher education institutions were involved: FBMI, Novo Mesto, Faculty of Health Sciences of Novo Mesto, Faculty of Information studies in Novo Mesto, Faculty of Economics in Ljubljana and Podgorica, Faculty of Business and Management Sciences of Novo Mesto, and Faculty of Chemistry and Chemical Technology in Ljubljana. Associated business executives were: Repa system solutions - retail sale per mail, Gašper Repanšek, Vigros - wholesale and retail, Idearna - advertising agency, and Stor, Dorian Savić, involved in the sale. The funder of the projects was SHRDSF.

Empirical Insights

Academics seek data for publication and funding to support their research (Frieske et al. 2015). Given the nature of the phenomenon, our empirical research mainly relies upon a qualitative exploratory research approach based on project work and document analysis.

The Europe 2020 strategy is focused on the EU capacity to create millions of new jobs to replace those lost in the past economic downturn. European Commission provides future standards of living. The quality of live will depend on the innovation ability of products, services, business and social process (Saguy 2013).

CASE STUDY

The businesses for this case study are small and medium sized enterprises (SME) of development and manufacturing services with headquarters in Slovenia. Recently, Repa.si, Stor, Vigros and Idearna undertook a position by adding a project to the creative path towards practical knowledge (PKP) (Gričar, Rodica, and Bojnec 2016) to their

TABLE 1 Number of Project Collaborated Academia-Industry in 2014/2015 Overall in Slovenia

Number of projects	2014		2015	
	Slovenia	FBMI	Slovenia	FBMI
Applied to the tender	312	2	598	5
Grant received	211	1	246	4

NOTES Adapted from Javni sklad Republike Slovenije za razvoj kadrov in štipendije (2016).

business process. They have had been elaborateness by business executives. The academia institution for this case study is FBMI.

This shift towards objectification of academia-industry nexus was identified in the case study also as project management. PKP project management is a well-established and recognized discipline within FBMI, Repa.si, Stor, Vigros and Idearna. The majority of managers are highly experienced, complete with professional project management certification which is granted internally. PKP project management is well structured and formalized within this institution.

An assignment of PKP project managers to projects is contingent upon the project type, scope and importance of the projects. PKP project managers are appointed from the ranks of academicians, academic managers and business owners, unit managers or technical experts. PKP project managers are consulted from the student body when it comes to performance evaluations of the PKP project.

The majority of projects are shorter than one year and are of the operational service type, such as internet sites, sandwich management, cost calculator and new regulations. There are eight individuals within the institutions, each located in different units. Collectively they form a (virtual) corporate, led by a PKP manager who reports to the president of the project applicant and to the funding organisation. Elaborateness were functional in 2014 and 2015, accompanied by almost 35 students in four different PKP projects.

The academician PKP mission was to facilitate, organize, and manage the PKP project as a way of doing work. This virtual corporate PKP consists of four sub-units. Each sub-unit consists of PKP project managers (academicians, business executives) and students. Each sub-unit has a student leader (imitator). The first group is named Development of a Mobile Application for Ordering a Service and a Recipe/Standard for a Sandwich with a Mobile Application (Sandwich). The second nomenclature is the calculation of transportation costs for SME (TransCost). The third nomenclature is an e-guide for allergens under the new regulation (E_PA). The fourth nomenclature

is an application for recognizing the essence of herbs (H4U). The aforementioned nomenclatures were also the titles of the projects funded by SHRDSF. In table 1 we present the projects. Firstly, the ones applied to the open tender. Secondly, the true projects that have been in progress in Slovenia and at the FBMI. We can see that at the second tender in 2015 we were the prizewinner by 80%, whereras the overall Slovenian success was 41%.

DEFINITION OF PRACTICES

The definition of practices includes the development of methods, processes and techniques. We have used three methodological approaches in the PKP project assignment. We have studied scientific and expert literature that covers the theoretical knowledge regarding the nature of the PKP project. Based on this study of the literature, we have defined the activities of the project. The project assignment has been performed with different methods distinctive of interdisciplinary and multidisciplinary projects (Molly, Ployhart and Wright 2011).

This is executed according to the testing and weighing of ideas, the presentation of results, their meaning and implications in the PKP projects regarding the studied service and its problems. Although the stress focuses on the methodological steps, the core of the project assignment is the applicative transfer of knowledge amongst the economy, the students and the higher education institution within the set activities of the PKP projects.

The set activities were carried out with several methods that are typical of scientific research and professional work. In the PKP projects fields, we used methods of: mechanical and thermal treatment of foods, methods of food safety, planting, herbs recognising and production of primary foods. When defining the computer programming and programming language that we used: the working methods in the computer room, modelling, computer-aided planning and the basic and advanced methods for working with files. The project also includes the scientific methods of sensory analysis, the survey method, the comparison method and the method of describing and summarising. For the quantitative definition of the PKP project assignments, we have also incorporated the methods of descriptive statistics.

AUTHORIZING AND VALIDATING OF PROJECTS

The findings of an academia-industry collaboration in Finland (Pohjola, Puusa and Iskanius 2015) indicate that although the experi-

ences of working in collaboration were mainly positive, the forum was not designed to be company oriented. Instead, the higher education institutions and the research organisations were the most beneficial. While higher education institutions engage in discussions at an abstract level, companies value more concrete tasks and measurable results. We also noticed that companies, unlike higher education institution, do not have the mechanisms to take advantage of the knowledge and utilise it to enhance their dynamic capability (Bartunek and Rynes 2014; Pohjola, Puusa and Iskanius 2015).

The PKP classifies projects as first class. This categorization is a composite of several measures of project scope, complexity and the importance of academia-industry nexus (Gričar, Rodica, and Bojnec 2016). Such examples include the academicians actively directing the students towards achieving the set objectives of each project.

Secondly, the academicians direct students towards the purpose of each project. Thirdly, the business executives actively participate in the implementation process of the project. Fourthly, the business executives introduce the students with the virtual work and sale – advantages, disadvantages, opportunities and competences. Fifth, the business executives actively introduce the students with the working process and guide them towards the parts of each project that are connected to the research in the project. Sixth, the students develop the project and form it together with the managers. Seventh, the students keep a progress timeline/report on the project and of the status of the project in the time when the project implementation is in progress. Eighth, the students acquaint themselves with virtual organisation and availability in the market. Ninth, the students prepare the final report alongside the academicians. This report contains information regarding who, when and how they have contributed to the realisation of each project. Tenth, the business executives and PKP manager prepare the final report on the performed project and give an opinion about the status of the project for further work. Eleventh, in the final phase of each project the working mentor evaluates whether the process is capable of competing on the market. The working mentor also specifies the intellectual property amongst the students and the company.

BRIEF OVERVIEW OF THE ACADEMIA-INDUSTRY NEXUS MANAGEMENT IN SLOVENIA

The mission of higher education institutions includes teaching, research and community service. This mission would inform graduates with up to date knowledge, carry out applied and basic re-

TABLE 2 Brief Overview of a Case Study of Academia-Industry Nexus Management

PKP projects	Duration	Companies	No. of students
Sandwich	6 months (2014)	Repa.si	5
TransCost	6 months (2015)	Vigros, Idearna	7
E_PA	6 months (2015)	Repa.si, Stor	10
H4U	6 months (2015)	Vigros, Idearna	10

NOTES PKP – path towards practical knowledge.

search for worldwide assist and finally serve the local/global community (Hanieh et al. 2015). Hanieh, et al. (2015) have shown a weak academia-industry cooperation in Palestine. They conclude that European experience of industry-academia partnership can be the base for developing similar programs and activities for Palestine and other developing countries. The brief overview of the Slovenian case study is tailored in table 2. In order to close the gap between academia and industry it is suggested to implement a syllabus improvement by including sustainability concepts and improving teaching methods (Gričar and Neary 2016).

Signing academia – industry nexus agreements is considered as the first step in building industry – academia partnership, but it is not sufficient as far. These nexus agreements have to emphasize the social equity, economic prosperity, environmental protection and global control, whilst solving the industrial technical and logistic obstacles. Cooperation may include carrying out scientific research activities and applying the results of these academicians to solve real problems within industry. The current partnership situation at the FBMI in Slovenia is presented as a case study in table 2.

The project Sandwich presented a unique chance to develop one of the business ideas in the field of natural science. The preliminary planning of the project was formulated by students and was based on searching for ideas and brainstorming development possibilities and the later upgrade of the product. Whilst developing the idea, we were connected and working alongside the Slovene company REPA. The web page of the project is http://pkpsandwich.weebly.com/.

The purpose of the User's Guide manual of the project 'TransCost' is to explain the usage of application and steps that have to be undertaken for the successful calculation of transportation costs. The steps in the guide are explained in order as they correlate with the application. These stages are numbered from 1 up to the last step in a single tab. You will be able to see and use two specific cells that require a numeric or verbal input. Regardless of the type of input,

each cell will directly perform an act within the application or indirectly within the chosen tab. Certain cells in excel are locked and are not meant to be used or modified by the user. Because the business needs the application for transport cost calculation we worked with Slovenian companies Vigros and Idearna. The web page of the project is http://transcost.altervista.org/.

The project 'E_PA' presented a unique chance to develop one of the company's business needs in the field of natural sciences. The result of the academia-industry cooperation is a modern step to the allergens. The information given to the customers should be clearly stated in the restaurants, shops, and everywhere the customer could purchase non-packed food. The print of the allergens from the Excel sheets is user friendly and easy to manage by employees. Whilst developing the need, we were connected and working with the Slovene company Repa.si. The project is unique in its development of interdisciplinary and multidisciplinary in the fields of numerous expertise. This nexus included gaining various types of knowledge in fields such as: food technology, cooking, computer programming, internet use, econometrics, market research and computer networking. Web page of the project is http://alergeni.altervista.org/.

The sole purpose of the H4U web page is to provide useful information for daily use to each person. We presented in one place most of the illness symptoms and its natural solutions. The essence of herbs are studied for the relevant information's posted on the web page. Students have been working with the industry to prepare a user friendly web page. Nexus of academia-industry has been evaluated as part of this project. The web page of the project is http://zelisca.info/.

We identified communication channels for reporting and communicating about the tasks related to the project (European Commision 2012). We assessed the progress made on the tasks we were assigned on a weekly basis. Moreover, we agreed to publish our work on the Cloud storage based solution, Google Drive. The latter is convenient as it enables the modification of documents that are used regularly. Everybody involved had full access to a Google Drive PKP group and its files. Managers were monitoring the students' progress on the project with internal Google Drive files. An additional advantage of having managers was the broad knowledge of inter/multidiscipline areas that they offer. During the project, we paid specific attention to how we could communicate more with the public, as well as with potential stakeholders also emphasized by the European Commission (2012).

The Statements and Discussion

There are several implications to the society from the PKP projects. This is most essential with regards to fashionable forces affecting dialogue process associated with academic-industry nexus. As we have indicated, these nexuses are not separate from management forces. The SHDRSF is one important example which makes SHDRSF recent movement away from Slovene Research Agency. The latter based almost entirely on scholarly impact to research excellence. On the other hand SHDRSF make formation that explicitly includes the impact of the research on practice as a way of assessing scholarly outputs. The Slovene government is playing a role in the ongoing academic-industry nexus.

In other words, this is a time when the proposed new system suffers from a set of internal contradictions regarding dimensions of academic-industry nexus are particularly important. Thus, it provides an exceptionally good opportunity for academicians to reflect on the rigidity we are undergoing in this domain of economics and management and consider what we need to do to keep going the appropriate degree of undergoing as opposed to trying to resolve the gap in academia-industry nexus gap. The statements of some people involved in the present academia-industry nexus management, can summarize the case study findings.

'The man who moved a mountain was the one who began by carrying away small stones.' This old Chinese proverb from philosopher, Confucius, served as a guidance throughout the business idea and is simultaneously my life motto. If we wish to see something magnificent and stable, our start must first be made of small steps. The latter relates to either the final goal of achieving business, or personal ambitions, wrote by a student.

The project PKP is an awesome idea! All work following the formal education is practical and students need more prior knowledge of practical work. Above all, the project team required team work, coordination, the sharing of ideas and the gaining of new experiences. As a sole trader, I find these kind of projects invaluable because they inspire new perspectives on life and business that the academia can gain, as well as new trends that exists amongst youth. I am satisfied with the execution of the project which has exceeded my expectations. In addition, 'I am pleased with how much the students were involved in the project and their enthusiasm,' wrote the owner of the company.

I observed the progress of the project with great enthusiasm, in

particular how the team had approached potential problems: with initiative, innovation, dedication and hard work from academic and business executors. The project consisted of practical experiences, specific competences, knowledge and skills that are essential in today's competitive market place. Evidence of this latter statement can be seen courtesy of the two members of our team who found employment directly after this project. There will soon be a third, pending another member's completion of formal education. Connecting formal education with the economy through this kind of project is warmly welcomed and I hope that this is only the start of something greater to come wrote a person of the project applicant.

Since the beginning of participation in the PKP projects, I have enthusiastically introduced and involved my staff and the headquarters. The new 'TransCost' application of cost calculator and H4U essence web page of herbs has been recognized as a tool of company work. Therefore, the business decided at the beginning of the PKP project to actively participate. Consequently, through the active participation in the PKP project, 'TransCost,' we have again delved into the cost of transport. Previously, it was 'over the thumb.' For our conclusion, we manage to correlate new business partnerships said second of the business executors involved. The state is suitable for cross-sector partnerships as an effective mechanism for private environmental governance, mentioned and measured empirically by Hahn and Pinkse (2014).

The first Slovenian study on academia-industry nexus topic. One benefit of our approach may be in opening up the debate about the academia-industry nexus management beyond groups of academics to include industry more entirely.

Conclusion

The foregoing study sheds light on facing industry and academia nexus management in Slovenia. The contents are summarized by the gap existing between the two mentioned sectors in economy and managers. A brief study for the situation of higher education institutions and related obstacles has been discussed, showing some data and an overview of the teaching/learning techniques. The status of industry has also been discussed, showing data and the activity that need to be undertaken. Some references and experiences from other countries have been illustrated here for comparison purposes.

The future perspectives of academia-industry nexus management, the analysed case study has been introduced. In this co-funded model, the awareness and market needs feedback is used to create

modern techniques capable of nexuses the two sectors to each other. Three sides have been included in the nexus – business executors and academicians. The latter consists of students and teachers or researchers.

Finally, this academia-industry nexus management can have the opportunity to see day light if it is applied on two tracks. The first is based on syllabus development, whilst the second track is based on making modern structural economic policy and innovative quality management strategy.

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The Readiness of the European Union to Embrace the Fourth Industrial Revolution

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Knowledge has become a crucial factor of production in the developed economies and, as humans are the carriers and utilisers of knowledge, skilled human resource is gaining similarly large relevance. These advancements are elements of the substantial changes that characterise the fourth industrial revolution – a phenomenon worth studying in detail. The European Union has been explicitly concerned about the shift to the knowledge economy since the Lisbon Summit of 2000. More than one and a half decades later the EU's readiness to embrace the knowledge-driven fourth industrial revolution can be examined. We undertake that by creating an index based on various related data.

Key words: 4th industrial revolution, knowledge-based economy, human capital, European Union

Introduction

Change has always been an immanent feature of the economy. However, in our times, changes occur at a pace faster than ever, and are even accelerating. Also, many of the changes are disruptive. Similarly, knowledge has in fact been a factor in doing business forever. According to Dosi (2012), 'economic theory is intrinsically about knowledge-based economies' (p. 167), while Saviotti (2012) claims that we can only identify the roots of today's knowledge-based society 'in the second half of the nineteenth century with the advent

of the modern university system and with the institutionalization of industrial R&D' (p. 211). Even so, knowledge has usually not been studied directly in economic theory but along connecting phenomena such as innovation (Saviotti 2012). In contemporary economics, Lundvall (1992) stated as early as in the beginning of the nineties that, in the economy as a whole, knowledge was the most important resource, and learning the most important process.

So, in our times, the role of knowledge is widening more than ever before, its importance is growing larger than before, and its creation, management and sharing is gradually but decisively transforming. This transformation is where the substantial roles of change and knowledge meet, both in economic theory, and in every-day business life. How have we gotten to this point, and where is Europe in this process now? The first industrial revolution took place in Europe though it originates in England, not from continental Europe. Since the second industrial revolution, though, the role of the main initiator has been taken over by the United States of America (USA). However, even in the USA technological advancement is posing huge challenges to maintaining employment levels (Martus 2015). The question how Europe, the European Union (EU) is (or is not) prepared to embrace or even master the changes occurring in the framework of the fourth industrial revolution can be asked. Our study addresses this question in the first place.

In order to be able to find answers to our own query, in our study we first take an overview of the phenomena often referred to by the umbrella expression of 'the fourth industrial revolution'. In our analysis, we pay special attention to two areas crucial for businesses to succeed in this new era: knowledge and human capital. We are interested in seeing how their nature and relevance as inputs to business success have altered with technological advancement, and how they can be developed and maintained by firms to remain competitive in this dynamic environment.

Afterwards, we change focus, from theory to analysis. In particular, we turn our attention to the economy of the EU as the specific subject of our investigation, i.e. how European integration as a whole is (or is not) reacting to the changes underway, and how the EU member states are performing in the areas identified as inevitable in the successful adoption to these changes.

As regards the EU member states, we also conduct a statistical analysis in order to depict a fact-based, sufficiently detailed picture of the current state of affairs in relation to the main fields of our investigation. At last, based on our analyses, we make some cautious

predictions regarding the prospects for the economy of the EU in the foreseeable future.

The Fourth Industrial Revolution

The *fourth industrial revolution* (also referred as *industrial revolution 4.0* or, in Germany in particular, *Industry 4.0*) is currently the subject of debate in the economic literature as academics are trying to make reasonable projections for the future. On one hand, some argue that the fourth industrial revolution and future innovations in general do not imply such a growth potential what we have experienced in the past, for example with the generation of power (Gordon 2014). On the contrary, other theorists claim that the impacts of the fourth industrial revolution and the on-going digitalisation on innovation and growth will be ever stronger (Brynjolfsson and McAfee 2014).

The World Economic Forum (WEF) organised its 2016 Annual Meeting in Davos around the topic of the fourth industrial revolution. The director of the WEF, Schwab (2016) released his book dedicated to the topic precisely for the meeting. He takes a thorough overview of the ongoing and predicted changes in how we work, live, and do business, starting with the main affirmation that 'changes are historic in terms of their size, speed and scope' (Schwab 2016). At the same time, we have to discover that technology is not an exogenous factor in the lives of individuals and businesses; quite the contrary, it is a tool to embrace, an opportunity to grab. In particular, the fourth industrial revolution is characterised by: widespread and broadly accessible internet; smaller, cheaper and more powerful sensors; artificial intelligence; and machine learning. The drivers of the change are physical (autonomous vehicles, 3D printing, advanced robots, new materials), digital (internet of things, relationship between things, and people connected by technologies and platforms), and biological (genetic sequencing and genetic engineering, synthetic biology and biological editing).

At present, technological transformation is changing practically every aspects of economic and social life, including basic mechanisms like demand formation, capital accumulation, or employment generation (Dosi 2012). And also *market structures,* with the appearance of two- or multi-sided markets, and platform economics. Two-sided markets are the ones where there are two or more, clearly distinguishable groups of users whose demands are interdependent and therefore either or both groups produce positive externalities. At present, many industries operate as two-sided markets. In this setting, it is a platform that ensures room for interaction among the

different groups, making it easier for them. Platforms play a distinctive role in reducing transaction costs.

Two-sided markets were first analysed by Rochet and Tirole (2003). Upon their classification, economic theory distinguishes four different types of *platforms* (Evans 2011, 5–9): those of exchange, the media, transaction systems, and software platforms. Nevertheless, regulation of platforms is far from advanced and is only sluggishly following markets. Regulators are still lacking new robust models so they are constrained to using traditional methods in the course of their investigations, which raises the risk of false conclusions. In particular, traditional approximations of demand tend to underestimate the size of the relevant market and thus overestimate market distorting effects.

Under the fourth industrial revolution, firms change substantially as well. They are 'no longer viewed merely as machines of transactional efficiency, bureaucratic order of labour exploitation. They are seen as repositories of competences, knowledge and creativity, as sites of invention, innovation and learning' (Amin and Cohendet 2012, 403). In fact, firms appear as a cognitive platform for interacting communities. Importantly, corporate culture is part of the common knowledge.

We are also witnessing large communities of businesses organising themselves into complete *business ecosystems*. These are 'dynamic and co-evolving communities of diverse actors who create and capture new value through both collaboration and competition' (Canning and Kelly 2015, 4). Such businesses are shaping their own business landscape, act as collective wayfinders. They share resources and they work cooperatively and competitively at the same time. Their adaptive and transformative capabilities are exceptional and, in fact, immanent. In such business ecosystems, value creation no more occurs linearly, along a value chain, but in a network structure called the value web. Ecosystems realise synergies, which makes them attractive for individual firms, be they small or large.

Knowledge and Human Capital in the Fourth Industrial Revolution

In relation to the fourth industrial revolution, there are some specific characteristics of knowledge as an asset or factor of production that are worth discussing. Firstly, knowledge has many faces. And knowledge has been approached many ways in economic theory. In the pragmatist theory of knowledge, it arises from the method of inquiry that rests on creative hypotheses and experiences. Moreover, acquir-

ing knowledge is not an individual process but it is taking place in a collective dimension; therefore, institutions, and especially their quality, play a role (Dutraive 2012).

Amin and Cohendet (2012) identifie the so-called *knowing communities* which are triggered by the fast expansion and growing complexity of the knowledge base and the organisational challenges posed by the need to acquire and utilise knowledge within strict time limitations. In such an environment, knowing communities act as pools of various competences that can be deployed in highly flexible manners. They can be formed within traditional organisations or across old structures. Knowing communities have no clear boundaries but are kept together by individual passion on behalf of its members and commitment to the common goal. Nevertheless, economic aspects appear among the motivations of the participants. In such cooperating communities, the frequency of interactions considerably reduces opportunistic behaviour. Belonging to the community is experienced in the jointly undertaken process of validation and interpretation of the common knowledge.

Kasper, Streit and Boettke (2012) also emphasise that knowledge (and skills) are spreading in the various communities of humans, 'despite the fact that each and everyone has a limited capacity, limited resources and limited time to acquire and evaluate new information and to compound it to knowledge' (p. 46). They interpret knowledge in an exceptionally wide sense, including knowledge on where and what to buy, what new products to try out, rivals, close substitutes, product variations, production processes, organisation, communication and selling methods, possible exchange partners, etc. They also discuss the costs of the knowledge management processes and, even if not naming them as such, are mentioning platform-type actors (calling them middlemen and their activities intermediation) who urge to contribute to the reduction of those costs for their business partners. In their view, in the knowledge economy, the main functions of competition are: to find and test useful knowledge, to disperse that knowledge, and to control errors. Those suppliers win the competition that are successful in lowering their and their consumers' transaction costs, rather than production costs.

Dosi (2012) also claims that knowledge is a rather wide concept, it includes, for example, 'tacit and rather automatic skills like operating a particular machine or correctly driving a car' (pp. 171–2) and its accumulation may happen both through informal mechanism of learning by doing and also in much more formalised processes. According to Saviotti (2012), a way to grab the concept of knowledge in

the economic theory framework is to accept its two properties: that knowledge is a co-creational structure, and a retrieval or interpretative structure. This way we are properly equipped to analyse the processes of knowledge creation and utilisation, even enabling ourselves to map the knowledge base of firms.

In the *knowledge-based economy,* many new aspects have to be considered by applied economic theory. If an economy is primarily knowledge based, its self-sustainable growth is rather likely (Dosi 2012). The web economy is a specific manifestation of the knowledge-based economy. The web economy can in fact be divided into four major platforms: e-commerce, online publishing, social networks, and online advertising. In comparison to regular markets, here new features appear and influence the market: the critical mass (of suppliers and/or users) is more relevant, fees are calculated in a more complex way (in fact, some user groups may eventually enjoy some products or services free of charge) than in traditional linear markets, and there is a so-called 'invisible engine' (Evans 2011) operating in these markets, catalysing trade.

In the knowledge-based view of the firm, rationality is bounded, knowledge has tacit elements and is distributed within and across firms. Transaction costs are functions of (economically relevant) knowledge, and so is value creation and value appropriation. *Knowledge assets* are eventually owned and controlled by individual agents who are becoming increasingly important to the firm. In this theoretical context, the major strategic objective of creating and maintaining competitive advantage are pursued through targeting the optimisation of these transaction costs (Foss 2005). Besides scaling economies there can be substantial learning economies and not only in relation to knowledge on the market (Church and Ware 2000) but also regarding knowledge as an asset of good in itself.

Information, knowledge, or software are not only inputs but also outputs of production (i.e. they are goods). In the context of the knowledge economy, the concept of *club goods* is interpretable (Elsner, Torsten, and Schwardt 2014), referring to the in-between status between private and public goods, i.e. when a certain group of agents have access to them. Within this group, *network goods* are the ones of which the owners construct a network – in such cases, network externalities also arise. As for knowledge itself, it can be a private or a public good but, in most of the cases, it is somewhere in-between. In this respect, we can identify two parallel tendencies: on one hand, there are strong incentives to provide access to knowledge, even if it is codified knowledge. At the same time, in part connected to the

above tendency, there is also a strong push to protect intellectual property (Lundvall 1992).

In this environment, the main question is who bears the costs of development and in what way, and how the income realised on investments is distributed. Besides the usual issues of industrial organisation (pricing, effects of scale, tying, planned obsolescence etc.) new ones come up, including compatibility and interoperability, pirating, or open source as a business model (Elsner, Torsten, and Schwardt 2014). For economic modelling, even if network science methodology is applied, the two-sided markets where there are two (or more) multiple, distinct, and separable groups of actors (see above), bring further new challenges, especially as there presumably exist *network externalities* within the groups, and for the whole of the network as well.

Relevant literature identifies two models of *knowledge creation* (Lundvall 1992): in the STI model, there is a science – technology – innovation sequence occurring. In the other approach, the so-called DUI mode, it is the steps of doing – using – interaction that are taken. In Lundvall's (2012) view, 'while the output of the DUI mode may be a tangible new product with embodied technical knowledge – such as a numerically controlled machine tool – the outcome of the STI process may be disembodied knowledge that can be widely distributed. But the more codified form also makes it easier to protect this kind of knowledge through intellectual property rights in the form of patents or licenses' (p. 307).

The term *knowledge society* is not unknown in academic literature either, as it has already been described and expanded during the previous decades by notable scholars in the field, like Drucker, Mansell or Stehr (UNESCO 2005). Developing a knowledge society gained its momentum at the end of the last millennium as the information technology started to develop at such pace that the world has never experienced before. Focus turned on new industries like cybernetics, biotechnology, nanotechnology etc., areas which require an advanced level of knowledge. Soon economies recognized that having a highly skilled labour force is a necessary precondition of the establishment of a knowledge-based society. The main driver of developing the level of high-skilled labour force is sharing knowledge among members of the society. Higher education institutions and private sector enterprises are those, who can contribute the most to fostering innovation and the transition into a knowledge-based economy. Knowledge is a complex phenomenon that is influenced by education, technological development, and innovation as well.

Taking into consideration the pro and contra arguments, we can be sure that the current trends and changes will have a major impact on the *future of jobs and skills* required on the labour market, especially as it is also going through a transformation (Acemoglu and Autor 2010). For example, the boundaries of routine and non-routine tasks are pushed further by technology (Autor and Dorn 2013; Goos, Manning, and Salomons 2009). The non-routine tasks at the lower and the higher ends of the skill scale are the ones that are not likely to be automated. This may lead to the further polarization of the labour market since knowledge workers are already in more favourable positions. In fact, currently the highest potential for productivity and growth is located in the knowledge sector (European Commission 2015).

Furthermore, employment has a strong connection with *educational attainment*. As Esping-Andersen claimed, back in 2002, 'accelerating the pace towards a knowledge-intensive economy implies heavy investments in education, training and cognitive abilities. Those with low human and social capital will inevitably fall behind and find themselves marginalised in the job and career structure. It is accordingly tantamount that educational investment be as broad-based as possible' (Esping-Andersen 2002, 79). Lindley (2002) was observing that, already at that time, 'knowledge workers and the socially excluded seem destined to live in different worlds' (p. 95) and that the best tool to fight social exclusion was education. For this reason, we claim that *education* is of key importance when we talk about knowledge, skills and human capital.

The formation of future human capital is taking place today so education systems also have to adapt to current changes in order to be able to deliver the knowledge and skills required in the future. First, instead of the silo type approach in education, there is a need to develop individuals with cross-functional skills encompassing both technical and social analysing skills (World Economic Forum 2016). The skills required may vary across industries; however, the complex problem-solving ability is of growing importance in every sector. Second, the issue of skill mismatches has already been identified in the European Union (European Commission 2016) but still it is generally associated with the present state of skill gaps. In our point of view, what raises more concern is that the skills acquired or being taught today are not matching the skills demanded in the future.

Technology is at the same time the trigger and the enabler of transformation in education. The new skills and competences required in the labour market of the future can be developed by inte-

grating technology into education. Besides the basic digital skills, students have to acquire programming and advanced computing skills, learn how to use big data and how to utilise online learning platforms for sharing knowledge (OECD 2016).

However, the *human capital* present in the labour market today should also be maintained. Businesses and their managements have a great responsibility in upskilling and reskilling the current labour force by encouraging life-long learning and providing on-the-job training. Maintaining human capital should be a priority for businesses if they wish to survive under the fourth industrial revolution. Moreover, investment in skills and human capital is also associated with higher levels of competitiveness (Pelle and Laczi 2015).

The European Economy at the Verge of the Fourth Industrial Revolution

The European Council agreed in March 2000 in Lisbon that: 'The European Union is confronted with a quantum shift resulting from globalisation and the challenges of a new knowledge-driven economy. These changes are affecting every aspect of people's lives and require a radical transformation of the European economy. The Union must shape these changes in a manner consistent with its values and concepts of society and also with a view to the forthcoming enlargement.' (European Council 2000) Accordingly, the strategic goal was set for the 2000–2010 period, name that the EU should 'become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion.' (European Council 2000) Already at the time of the Lisbon presidency of the EU in the first half of year 2000, the main question was how knowledge was going to shape Europe's future and experts agreed that Europe was on the crossroads whether to maintain a leading position in the global economy or losing relevance (Rodrigues 2002).

The strategic goal of the Lisbon strategy was reaffirmed and renewed with the adoption of the Europe 2020 strategy in March 2010 (European Council 2010). According to the Europe 2020 strategy, the EU should realise smart, sustainable and inclusive growth (these are the priorities) in the second decade of the 21st century. To this end, measurable targets were set in the fields of the three priorities. In May 2015, the European Commission published the Digital Single Market strategy and set out 16 initiatives to make it happen.[1] Among these, we can find provisions on fostering the digital business environment, making e-commerce easier, modernising copyright law,

analysing online platforms, and ensuring digital privacy and cyber security.

To see how prepared the European Union is for the arrival of the fourth industrial revolution, we examined some indicators that show R&D and innovation-related performance, and the availability of skilled human capital.[2] First, taking Eurostat data for gross national research and development expenditures (GERD) from the year 2014, we can see that German GERD is far beyond the other EU Member States (a total of 82,866 million EUR). However, taking size differences into account, GERD expenditures as a total cannot be compared directly. Instead we took the GERD per capita values for the year 2014 as the last available data. In this respect, the three Northern member states are the best performers, then come five out of the six founding member states, Italy being an exception. Western countries, and also Austria and Slovenia, are in the mid-range as well. The major Southern Eurozone countries (Spain, Portugal and Italy) seem to perform slightly better than Eastern new member states but are still lagging behind their Western neighbours.

This indicates a clear distinction to be drawn between the Western member states and those countries that joined the EEC/EU later, the majority of them being referred to as new member states. In 2014, Denmark spent 1,413 EUR per inhabitant on research and development, this being the highest among the 28 member states. Denmark is followed by fellow Northern countries Sweden and Finland, then Austria, Luxembourg, and Germany as well, also spending more than 1,000 EUR per capita on R&D. The worst performers are Romania, Bulgaria and Croatia, with a difference between them and the best performers being more than 1200 EUR per capita.

Fostering innovation and encouraging research and development has been a priority of the EU since the Lisbon strategy. Connected to the Europe 2020 strategy, a flagship initiative called Innovation Union has been launched. As part of the five main targets of the strategy, an overall goal of R&D spending to reach 3% of EU GDP was set (European Commission 2016). If successful, this initiative and the Digital Single Market agenda together are to make the desired goal of the EU becoming the most competitive economy of the world finally reached. R&D and innovation, often referred to as R&D&I, contribute to the functioning of a well-established knowledge-based society which in the long run could benefit not only European businesses, but governments as well, and would improve living conditions and provide further opportunities: more jobs or better social services for citizens.

But still, halfway through the Europe 2020 programme, the desired goals have not been realised yet, and regional differences mentioned above persist, making the core and the periphery diverge further away from each other. Western Member States seem to be able to reach the 3% goal in R&D expenditures, and Northern countries like Sweden, Finland and Norway have Falready surpassed it. Still, new member states and the Southern Eurozone countries show generally lower performance and, in their cases, the national target is adjusted lower as well, taken into account their circumstances and current state of affairs. The fact that even the headline indicator was set lower for the majority of the countries in the periphery indicates that these countries might not be able to catch up with the fast technological development, not even in the future.

The number of patent applications to the European Patent Office (EPO) shows one aspect of the innovative performance of a country. The latest available data for the number of patent applications per million inhabitants is from 2013. On average, 113.27 patent applications were submitted to the EPO per million inhabitants; however, the divide between the core and the periphery is, again, vast. While Sweden, as the best performer, had 301.97 patent applications per million inhabitants, the latest joining member states, Croatia, Bulgaria and Romania all have less than 5 per million citizens. New member states, with Slovenia being an exception again, generally submitted less than 30 patent applications per million inhabitants to the EPO in 2013.

The number of R&D personnel in full-time equivalent is not a good indicator to be compared directly either but the rate of R&D personnel as a percentage of the active population makes data comparable and also shows how much effort a country puts into developing a steady base of human capital to improve its research and development performance. The same pattern as explained above can be noticed in this case as well: the ratio of R&D personnel measured in full-time equivalent as a percentage of the active population in 2014 is the highest among Western and Northern countries, with Denmark having 2.02%, followed by Finland, Luxembourg, Sweden, and the old member states. Slovenia ranking 7th among them with 1.46% is again the exception from the new member states that have generally lower rates, most of them below 1%.

Another challenge Europe is facing is the transformation towards the knowledge-based economy. As universities and higher education institutions drive innovation in Europe, one target within the education-related initiatives of the Europe 2020 strategy is that, by

2020, more than 40% of the population aged 30–4 should have a tertiary education degree. It is a promising fact that, by 2014, the majority of the Member States were above 30%, and more than half of them already reached the 40% goal and have been working to reach higher goals (Eurostat 2015). In this case, the previous pattern of core and periphery diverging cannot be observed: from the old member states, Italy is the one that has the lowest rate with 23.9% and is also the last from all the EU member states. However, Germany is also among those performing the lowest rates, far below the EU28 average (37.9%) while, from the new member, states Lithuania and Cyprus, both having a level above 50%, manifest that, for tertiary education attainment, Eastern countries are able to perform just as well as their Western and Northern neighbours.

Almost all the mentioned indicators show that the core and the periphery of the EU are far from reaching the same development level towards building a well-functioning knowledge-based economy. In fact, this divergence remains an urgent problem that the EU has not been able to tackle so far. There are some exceptions, namely Slovenia and the Baltic states, that have succeeded in realising convergence towards Western European levels: Estonia has introduced e-Residency, a transnational digital identity[3] to unleash the country's full business potential while Slovenia has carried out serious ICT investments and has made huge efforts to turn the vision of the knowledge economy into reality (Bučar 2006; 2011). However, regional differences in the majority of the region continue to persist and, in fact, the gap between the core and the periphery has deepened even more in the aftermath of the financial crisis, now merging the group of the Southern Eurozone countries and the Eastern new member states into one group: the periphery (Pelle 2015).

Data Analysis

In order to discover EU member states' readiness for the fourth industrial revolution, we introduced a new index based on Eurostat data, called *Industry 4.0 Readiness,* and also carried out a cluster analysis to reveal territorial differences among the member states. In creating the new index, we followed the methodology the World Economic Forum uses to generate new indices based on the calculation of secondary indices (World Economic Forum 2013). The calculation is carried out according to the following formula:

$$\frac{country\ value - sample\ minimum}{sample\ maximum - sample\ minimum}. \quad (1)$$

TABLE 1 Indicators Used to Create Industry 4.0 Readiness Index

Name of indicator	Unit of measurement
(a) Total intramural R&D expenditure (GERD)	Euro per inhabitant
(b) Gross domestic expenditure on R&D (GERD)	Percentage of GDP
(c) Community trade mark (CTM) applications	Per million inhabitant
(d) Community design (CD) applications	Per million inhabitant
(e) Total R&D personnel and researchers	Percentage of active population – numerator in full-time equivalent (FTE)
(f) Tertiary educational attainment	Percentage of age group 30–4
(g) ICT specialists	Percentage of total employment
(h) Digital single market – promoting e-commerce for businesses, enterprises selling online	Percentage of enterprises

We used 2014 data from the Eurostat database (as latest available), and chose indicators that are closely related to the innovative performance and development of the countries. We were keen on finding indicators to represent all fields introduced in this study; however, for one indicator, the number of patent application to the EPO, no 2014 data were available so we had to omit that dimension from our analysis. Our *Industry 4.0 Readiness* index thus consists of 8 indicators (tables 1 and 2).

While forming our new index, first, we calculated secondary indices based on the above introduced formula and then, as a result, created values that lie between 0 and 1 for all indicators (this comes from the very nature of the applied formula) where 0 represents the country with the lowest value in that sample and 1 being the best performer. As the next step, we took the simple average of the values and created the final *Industry 4.0 Readiness* index (table 3). Unfortunately, in the case of Croatia, data were not available for the ratio of enterprises selling abroad so we could not set up the index for Croatia. For the other 27 countries, after having the index calculated, we sorted them from highest to lowest in order to show which country is the best prepared for the upcoming challenges of the fourth industrial revolution (furthest right column of table 3). We also made a visual representation of the data (figure 1). The outcome of our analysis confirmed our prior expectations of Northern and Western countries being better prepared for the upcoming technological and innovation challenges.

To further underpin our assumptions of the territorial differences in this respect, we carried out a cluster analysis. From the above used

TABLE 2 Components of Industry 4.0 Readiness Indicator and EU Member States' Performance along These, 2014

Country	Raw indicators							
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
EU28	558.4	2.03	163.03	30.92	1.14	37.9	3.66	17
Sweden	1411.3	3.16	269.88	59.82	1.61	49.9	6.00	25
Luxembourg	1117.4	1.24	2279.50	191.02	1.94	52.7	5.09	7
Denmark	1413.0	3.08	269.23	77.48	2.02	44.9	3.86	26
Finland	1194.6	3.17	191.33	58.15	1.95	45.3	6.66	15
Belgium	881.3	2.46	185.47	34.09	1.38	43.8	4.39	23
Austria	1155.9	2.99	342.19	58.89	1.54	40.0	3.77	13
Ireland	623.5	1.55	223.86	22.15	1.16	52.2	4.62	27
Germany	1026	2.84	231.10	43.48	1.43	31.4	3.68	23
Netherlands	776.9	1.97	236.31	49.79	1.38	44.8	4.96	13
United Kingdom	595.9	1.72	183.09	27.90	1.19	47.7	4.87	20
Slovenia	431.9	2.39	168.84	50.46	1.46	41.0	4.78	14
France	730.7	2.26	113.71	27.04	1.47	43.7	3.47	12
Czech Republic	294.0	2.00	85.80	24.45	1.22	28.2	4.12	27
Estonia	217.3	1.46	231.03	23.56	0.86	43.2	4.95	12
Spain	273.6	1.20	188.51	19.69	0.87	42.3	3.09	17
Malta	158.3	0.85	898.01	56.42	0.82	26.5	4.58	16
Lithuania	125.6	1.02	76.78	12.57	0.76	53.3	1.94	18
Hungary	144.7	1.38	53.35	7.09	0.84	34.1	4.85	10
Cyprus	96.4	0.47	490.68	27.97	0.29	52.5	2.37	10
Portugal	213.8	1.29	122.75	18.89	0.90	31.3	2.47	14
Poland	101.6	0.94	84.78	34.27	0.60	42.1	3.05	10
Slovakia	123.6	0.89	61.30	10.89	0.65	26.9	4.10	12
Italy	341.7	1.29	152.17	33.63	0.97	23.9	2.51	5
Greece	135.6	0.83	72.36	4.22	0.90	37.2	1.31	9
Latvia	81.3	0.68	79.94	14.99	0.58	39.9	2.03	7
Bulgaria	46.3	0.80	92.47	14.91	0.57	30.9	1.88	6
Romania	28.8	0.38	29.18	3.01	0.34	25.0	2.65	7
Croatia	80.0	0.79	30.14	4.24	0.53	32.2	2.85	n.a.

NOTES For names of indicators and units of measurement see table 1 above.

8 indicators, we had to leave Community Trademark and Community Design applications out of the examination as the outlier values of Luxembourg and Malta distorted the cluster creation process. Accordingly, we created our clusters considering the remaining 6 main indicators. As a result of our analysis, we succeeded in setting up 4 clusters that all have their distinctive features (tables 4 and 5).

The first cluster represents the most innovative and developed

TABLE 3 Industry 4.0 Readiness indicator, EU Member States, 2014

Country	Secondary indicators								Industry 4.0 Readiness	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	Score	Rank
Sweden	0.998772	0.996416	0.106962	0.302165	0.763006	0.884354	0.876636	0.909091	0.72968	1
Luxembourg	0.786447	0.308244	1.000000	1.000000	0.953757	0.979592	0.706542	0.090909	0.72819	2
Denmark	1.000000	0.967742	0.106673	0.396096	1.000000	0.714286	0.476636	0.954545	0.70200	3
Finland	0.842219	1.000000	0.072056	0.293282	0.959538	0.727891	1.000000	0.454545	0.66869	4
Belgium	0.615879	0.745520	0.069452	0.165310	0.630058	0.676871	0.575701	0.818182	0.53712	5
Austria	0.814261	0.935484	0.139095	0.297218	0.722543	0.547619	0.459813	0.363636	0.53496	6
Ireland	0.429634	0.419355	0.086512	0.101803	0.502890	0.962585	0.618692	1.000000	0.51518	7
Germany	0.720416	0.881720	0.089729	0.215255	0.658960	0.255102	0.442991	0.818182	0.51029	8
Netherlands	0.540457	0.569892	0.092044	0.248817	0.630058	0.710884	0.682243	0.363636	0.47975	9
United Kingdom	0.409695	0.480287	0.068394	0.132387	0.520231	0.809524	0.665421	0.681818	0.47097	10
Slovenia	0.291215	0.720430	0.062062	0.252380	0.676301	0.581633	0.648598	0.409091	0.45521	11
France	0.507080	0.673835	0.037563	0.127812	0.682081	0.673469	0.403738	0.318182	0.42797	12
Czech Republic	0.191591	0.580645	0.025161	0.114036	0.537572	0.146259	0.525234	1.000000	0.39006	13
Estonia	0.136180	0.387097	0.089698	0.109303	0.329480	0.656463	0.680374	0.318182	0.33835	14
Spain	0.176853	0.293907	0.070803	0.088719	0.335260	0.625850	0.332710	0.545455	0.30869	15
Malta	0.093556	0.168459	0.386090	0.284081	0.306358	0.088435	0.611215	0.500000	0.30477	16
Lithuania	0.069932	0.229391	0.021152	0.050848	0.271676	1.000000	0.117757	0.590909	0.29396	17
Hungary	0.083731	0.358423	0.010741	0.021701	0.317919	0.346939	0.661682	0.227273	0.25355	18
Cyprus	0.048837	0.032258	0.205081	0.132759	0.000000	0.972789	0.198131	0.227273	0.22714	19
Portugal	0.133651	0.326165	0.041581	0.084464	0.352601	0.251701	0.216822	0.409091	0.22701	20
Poland	0.052594	0.200717	0.024707	0.166268	0.179191	0.619048	0.325234	0.227273	0.22438	21
Slovakia	0.068487	0.182796	0.014273	0.041913	0.208092	0.102041	0.521495	0.318182	0.18216	22
Italy	0.226051	0.326165	0.054654	0.162864	0.393064	0.000000	0.224299	0.000000	0.17339	23
Greece	0.077156	0.161290	0.019188	0.006436	0.352601	0.452381	0.000000	0.181818	0.15636	24
Latvia	0.037928	0.107527	0.022557	0.063720	0.167630	0.544218	0.134579	0.090909	0.14613	25
Bulgaria	0.012643	0.150538	0.028125	0.063295	0.161850	0.238095	0.106542	0.045455	0.10082	26
Romania	0.000000	0.000000	0.000000	0.000000	0.028902	0.037415	0.250467	0.090909	0.05096	27
Croatia	0.036989	0.146953	0.000427	0.006542	0.138728	0.282313	0.287850	n.a.	n.a.	n.a.

NOTES For names of indicators and units of measurement see table 1 above.

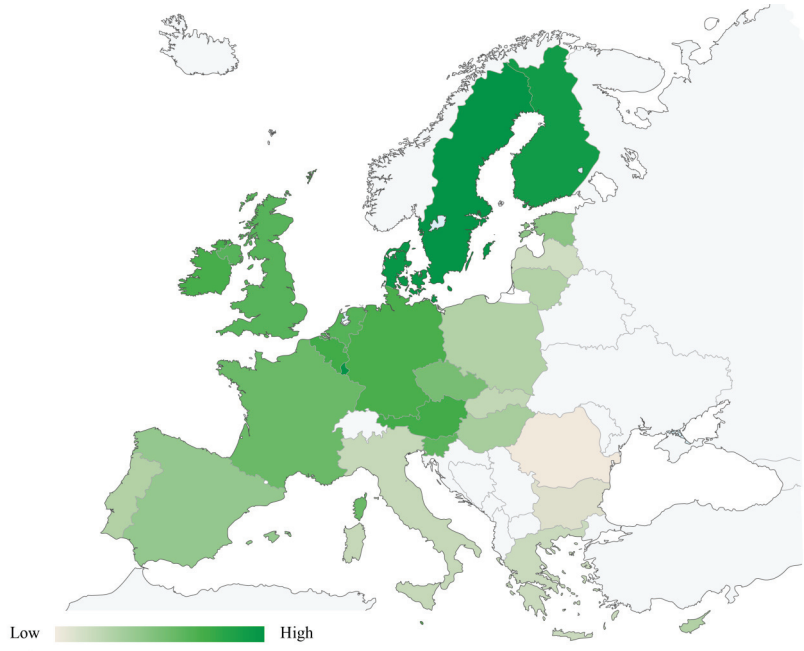

FIGURE 1 Industry 4.0 Readiness, EU Member States, 2014 (OpenHeatMap based on authors' calculations)

TABLE 4 Cluster Division

Cluster	Member States
1st	Belgium, Denmark, Germany, Austria, Finland, Sweden
2nd	Bulgaria, Estonia, Croatia, Italy, Hungary, Malta, Romania, Slovakia
3rd	Czech Republic, Ireland, France, Luxembourg, Netherlands, Slovenia, United Kingdom
4th	Greece, Spain, Cyprus, Latvia, Lithuania, Poland, Portugal

countries, with outstanding values in all indicators. In 2014, member states in this cluster spent on average 1180.35 Euros per inhabitant on research and development, total R&D expenditures being at average 2.95% of GDP. The ratios of R&D personnel and ICT specialists are also the highest in this group, indicating that these countries are on the best way towards a well-established and well-functioning knowledge-based economy and society. The rate of online trading enterprises was 20.83% on average, again the highest among the clusters.

The second and the fourth clusters show similar characteristics, primarily by performing the lowest values. Nevertheless, the two

TABLE 5 Cluster Characteristics

Characteristics	Cluster			
	1st	2nd	3rd	4th
Total intramural R&D expenditure (GERD), euro per inhabitant	1180.3500	142.5875	652.9000	146.8429
Gross domestic expenditure on R&D (GERD), percentage of GDP	2.9500	0.9800	1.8757	0.9186
Total R&D personnel and researchers as percentage of active population – numerator in full-time equivalent (FTE)	1.6550	0.6975	1.4029	0.7000
Tertiary educational attainment, percentage of age group 30–4	42.5500	30.3375	44.3286	42.6571
ICT specialists, percentage of total employment	4.7267	3.5463	4.5586	2.3229
Digital Single Market – promoting e-commerce for businesses, enterprises selling online, percentage of enterprises	20.8333	8.5000	17.1429	12.1429

clusters face different challenges: while both of them have similarly low gross domestic R&D expenditures, in the second cluster, tertiary educational attainment on average is about 12 percentage points lower than in the fourth cluster, the rate of enterprises trading online and the rate of R&D personnel are also the lowest, indicating that they are lacking high skilled human capital. Countries with the lowest *Industry 4.0 Readiness* values belong to the second cluster. At the same time, members of the fourth cluster struggle with the lack of ICT specialists but, at the same time, they perform better regarding tertiary education attainment, the group average even exceeding the best performing group's mean tertiary education attainment value. Thus, we can say that countries in the fourth cluster are at least showing commitment towards development. (Answering the question in what way Greece and Spain have arrived in this cluster is outside the scope of this study but, at first site, their current position may be the result of diminishing readiness, instead of development.)

The third cluster represents Western Europe and, as we can see, Slovenia and the Czech Republic also belong to this group. This cluster can be considered as a follower of the first cluster, with just slightly lower mean values, except for tertiary educational attainment, which is the highest among all clusters. Member states in this cluster can be considered as having a sufficient supply of highly

skilled labour, yet do not paying as much attention to investing in research and development as their Northern neighbours.

To conclude the data analysis, we confirm our assumptions of the existence of territorial differences. However, instead of a core and a periphery, we could compose four distinct clusters: the North, the West, the East, and the South. The North and the West show similarities but differ slightly in the intensity in research and development expenditures while the East and the South also share common features but differ in the availability of highly skilled labour force.

Conclusions

We are living in a time of substantial changes. Knowledge, technology and new business models are shaping our present and future. Adaptability, preparedness, and responsiveness are key ingredients to success, not only at the level of individuals and businesses, but also for countries or economic blocs as the European Union itself.

According to our analysis, the EU as a whole is performing acceptably well to meet the challenges posed by the fourth industrial revolution. However, if we go to the level of individual member states, we can identify vast differences among them in this respect. Our *Industry 4.0 Readiness* indicator and our cluster analysis have also highlighted these differences. According to the latter, the EU is divided into four distinctive groups of countries: a North (being the most prepared for the changes), a West, a South, and an East. The tendencies are not showing in the direction of convergence or homogeneity, implying that policy action would be needed to scale up the periphery in order to avoid even more serious fault-lines within the EU.

Notes

1 See http://europa.eu/rapid/press-release_IP-15-4919_en.htm

2 All data in this section can be found at http://ec.europa.eu/eurostat/web/europe-2020-indicators/europe-2020-strategy/headline-indicators-scoreboard and at http://ec.europa.eu/eurostat/web/science-technology-innovation/data/main-tables

3 See https://e-estonia.com/e-residents/about/

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Evidence on Economic Growth and Financial Development in Montenegro

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Macroeconomic development must be supported by a stable and efficient financial system. There are many different measures of financial development that are suggested when the relationship between growth and financial system is analyzed. In this paper we will identify the most important indicators of the financial development in Montenegro. Due to the fact that in the last decade Montenegrin financial market has been developing, we want to see if that fact had an influence on the economic growth, as well as if there is significant positive relationship between the growth and financial development. The intention of this article is to use principal components in order to examine correlation among indicators and find means or main components. This technique has the advantage of giving more general measures of financial development rather than individual variables for bank or stock market development. It could be concluded that it is difficult to identify the specific components of the financial system most associated with the economic growth.

Key words: economic growth, financial development, principal component analysis

Introduction

Montenegrin economy is a small open euroized economy. In the last fifteen years, particularly since its independence in 2006, Montenegro has achieved a significant progress measured in the increase of the gross domestic product (GDP). The major driver for this economic growth is definitely a high inflow of the foreign direct investments (FDIs). In terms of the share of FDIs in gross domestic product, Montenegro has been a leading economy in the group of European economies in transition in the pre-crisis period. One of the main drivers of FDIs was the process of privatization. These inflows were

dominantly oriented towards the service sector, especially banking, telecommunications, energy, trade and real estates. It resulted in the high growth of deposits and thus the development of the banking sector, as well as on the capital market development. On one hand, as the result of the sale of property and real estate, a part of the money was deposited in the banking system in the form of deposits. On the other hand, through the process of foreign investments, credible foreign companies arrived on the Montenegrin market and became important clients of the banking system.

However, the global financial crisis severely hit Montenegrin economy which was highly integrated into the regional and global trends. The economy is still dealing with the consequences of the collapse of the lending boom in 2008. The financial crisis influenced the deterioration of asset quality and weakened banks 'portfolios, finally leading to a credit contractions. The situations showed the vulnerability of Montenegrin banking sector. After seven years, there are some signs of the recovery, with the acceleration of the economic activity and a slow credit growth.

In the last years, much progress within the legal, regulatory and supervisory frameworks has been made in the development of Montenegrin financial system but further progress is nevertheless required. However, during this very volatile period, the development of viable financial sectors was perceived to be an especially challenging task. That is why we found interesting to analyze the linkage between measures of financial development and economic growth in Montenegro in the previous decade. When dealing with this topic, there are many opened questions. While the significant body of empiric literature investigated the relationship between financial development and economic growth, there is still a lot of space for more information especially in country specific cases, likewise in small euroized economies still in transition process.

One of the main tasks is to deal with the measuring of financial development. There are many different measures of financial development that have been suggested in the literature but two main ones are useful to consider: financial intermediaries and stock market development. The first are supposed to measure the level of development of financial intermediaries and the second to measure the size and efficiency of the stock market. As suggested by Saci and Holden (2008), the amount of foreign direct investment is important measure too, especially given the significance FDIs have had for Montenegrin economy.

Out of different variables we use for the measuring of financial

development, we use the method of principal components analysis to extract the financial development measure expressed through the principal components. While individually, the variables in the paper might not seem as a perfect measure of financial development, together, due to the correlation between them, they could give more important information about the financial system in Montenegro.

In the second section, a selective literature review of the relationship between financial development and economic growth is presented. We also present a brief overview of the financial development process in Montenegro in the third section. The fourth section gives a brief presentation of used data and methods. In the fifth section, the empirical results of the model measuring relationship between extracted principal components and economic growth in Montenegro are presented. The conclusions are presented in the sixth section.

Literature Review

Ever since the beginning of the twentieth century, there have been numerous studies of the relationship between financial development and economic growth. Some of the most relevant for this analysis are listed in the next paragraphs.

For example, Shumpeter (1912) stated that financial development through innovative entrepreneurship promotes economic growth. King and Levine (1993) examined this relationship on the sample of 80 countries for the period 1960–1989 and found the strong positive correlation between higher levels of financial development and economic growth rate. We have to emphasize that the finance-growth link is very complex, and that it depends on the stage of economic development of the country (countries) studied (Djalilov and Piesse 2011). Also, Al-Yousif (2002) concluded that the relationship between financial development and economic growth differs for different countries because each country has a different economic policy and a different institutional efficiency that is important for implementation of this economic policy. This can be confirmed by literature, so the brief overview of the studies dealing with empirical analysis of this link, is presented in the following paragraphs.

Several papers analyzed the relation between finance and growth in a single country. For example, Guiso, Sapienza, and Zingales (2004) found that financial development improves competition in the economy and so impacts the economic growth. Bertrand, Schoar, and Thesmar (2007) showed that reducing the government intervention in banking sector promotes growth through more efficient

resource allocation in France. Obradovic and Grbic (2015) examined the causal relation between the financial development and economic growth in Serbia, based on the quarterly data for the period 2004–2011. They found that economic growth contributes to the financial deepening, and that there is a significant unidirectional causality that runs from, on one side, a positive enterprise credit to GDP and a household credit to GDP to economic growth, on the other side. A causal relation is confirmed between the share of bank credits to non-financial private sector in total domestic credits and economic growth rate.

Regarding emerging and developing countries, there are very few research studies about the link between financial development and economic growth. Levine, Loayza and Beck (2000) found a positive impact of financial development on growth, and, in their large model with various variables, a positive and negative growth of inflation on growth, depending on the variable of financial development used. Koivu (2002) analyzed this relation for twenty-five transition countries in the period of 1993–2000. The results showed that the financial spread and the amount of nonperforming loans in banking sector positively influence economic growth. However, the banking sector credit to the private sector has a negative impact on growth, which can be explained by the banking crisis in the analyzed countries in 1990s. Dawson (2003) showed that financial development had no significant impact on the economic growth, for thirteen transitional countries in the Central and Eastern Europe. So, in this case, the economic growth was not limited by the underdevelopment of financial sector. Neimke (2003) explored the same link for another twenty-five transition countries in the period 1989–2000, using bank and stock market indicators. The results indicate that finance positively affected growth through investments and better resource allocation. He concluded that all transition economies suffer from outdated capital stocks. So, only the economies that have stimulated investment have boarded on a positive growth path. Beside the investment channel the financial sector influences the overall growth rate through the total factor productivity channel. The efficient financial markets play an important role in guiding the transition economies into the direction of higher growth paths and better standards of living.

On the other hand, Gillman and Harris (2004) analyzed the relation between financial development and growth for twenty-seven countries in the period 1965–1995. The findings indicate that when including the investment rate, the financial depth does not positively

affect the growth. Financial development is not robustly significant in this model, although a negative stand-alone effect on growth were found in some specifications. This suggests that in previous results a positive effect of financial development may have been obtained because financial development is proxying the rate of return to physical capital. Including this proxy through the investment rate, the level of financial development is found no longer important.

Mehl, Vespro, and Winkler (2005) investigated the relation between the financial development and growth for nine countries in Southeast Europe. They found that this relation is a negative one, which was explained in a way that less developed financial environment did not affect the economic growth.

Saci and Holden (2008) investigated the finance-growth relation using the annual panel data for thirty developing countries. They used the principal components analysis with the 10 financial development variables and five variables claimed to be important for growth. The results indicate that economic growth is related to a general measure of financial development, the stock market development and, to a lesser extent, government consumption.

Cojocaru et al. (2016) examined the finance-growth link in the former Communist countries of Central and Eastern Europe and the Commonwealth of Independent States in the period of 1990–2008. They found that measures of financial market efficiency and competitiveness are more important than the size of the market in terms of promoting economic growth.

Financial Development in Montenegro: Background

Banking sector of Montenegro virtually collapsed during the 1990s, as the country (at the time part of Federal Republic of Yugoslavia, a federation it made with Serbia) experienced one of the biggest episodes of hyperinflation in the world's history, amidst the break-up of communist Yugoslavia in a war (1992–1995), which primarily affected other ex-Yugoslav republics. In the spring of 1999 the country also went through a NATO bombing campaign against FR Yugoslavia, although being hit to a significantly lesser extent than Serbia.

Montenegro paved its way towards independence years before the independence referendum was held (2006), most notably through adoption of the Deutsche mark as the country's co-official currency with the Yugoslav dinar, in November 1999. Eventually, Montenegro abandoned the dinar altogether and unilaterally adopted the euro in March 2002, which since then has been the only legal tender in the country. It is in that period (1999–2002) that the Central Bank

of Montenegro (CBM) was established, which since then has been mandated with the following functions: banking regulation and supervision (recently including a broader, financial stability mandate), foreign reserves management, fiscal agent operations, payment system operations and, last but not least, research and statistics tasks.

Montenegro's financial system is banco-centric, as the firms are financed almost exclusively through banks, and the local stock exchange basically serves for secondary trading. In general, talking about financial institutions, banks (currently 14) are the most important financial intermediaries in Montenegro, comprising about 90% of financial institutions' assets. Out of them, foreign-owned banks (especially those which are subsidiaries of foreign banking groups) are the biggest, covering some 75% of total banks' assets. The insurance sector grew at an average rate of 3% in the last five years. Nine of 11 insurers are foreign subsidiaries, with 95% of total premiums. The rest of the nonbanking financial systems play a very minor role. The turnover on the capital market is very low and the bond market is very thin.

The history of modern Montenegrin banking can be divided into two distinct periods, 2001–2008 and 2009–2015. The first period was characterized by a rapid credit growth, fueled by massive amounts of FDIs the country was receiving (which in turn was contributing to a rise of deposits in the banking sector) and additionally supported by local banks' borrowings from their foreign parents. In other words, that was the period of a high loan-to-deposit ratio (up to 150%) and a high share of foreign borrowings in banks' total liabilities (up to 30%). Partially due to global financial crisis, but mostly due to unsustainable development model of the economy and stock exchange and real estate bubbles that formed in parallel, the tide changed in the autumn of 2008. First years of the period 2009–2015 were characterized by a sharp decrease in deposits, falling credit, soaring non-performing loans, huge losses that banks suffered, and consequentially by necessary recapitalizations by foreign owners (including a state intervention in the case of an important domestic bank). In parallel, foreign parents started to cut the borrowings (in a process called deleveraging), which continued until this day, so that at end-2015 borrowings constituted only 7.5% of banks' total liabilities. Deposits finally recovered to their pre-crisis levels in 2015 and at end-2015 stood at their historical maximum. Similarly, the situation for credit growth and non-performing loans stabilized only in 2015. At the end of 2015, annual credit growth was 0.8% (positive again, after several years), credit-to-deposit ratio was 90.9%, whereas the

share of non-performing loans, although significantly reduced in the meantime, was still in the range 12–13% (data from CBM).

Regarding regulatory standards, the Central Bank of Montenegro has been following the Basel rules as quickly as possible, whereas the latest Basel package (so-called Basel III), i.e. its EU equivalents – capital recruitments regulation and directive (CRD IV/CRR), should be implemented by the end of 2017, including both law and sub-regulatory acts.

Stock market in Montenegro saw similar developments as banking sector, except that the crash that followed the peak was extremely sharp (about 80%) and turnovers fell substantially, i.e. the market has never recovered. The stock market received enormous amounts of FDI money (especially from 2005 to 2007), but due to its shallowness, low levels of corporate governance in Montenegrin companies and weak protection of minority shareholders' rights, it proved to be only a field for highly speculative, short-term gain investments. A bubble formed relatively quickly, and could have only survived had the massive FDI inflows continued. As that was not possible, the bubble eventually burst, leaving an average boom-time investor with huge losses. Apart from that, stock market has never really served as source of financing for companies, and IPOs or offerings in general have been virtually non-existent. An exception is an offering of government bonds in March 2014, although the government otherwise has satisfied the bulk of its financing needs through so-called eurobond offerings abroad. Weak financial reporting, undeveloped corporate governance and weak protection of minority shareholders' rights persist as the most important factors that hinder stock market growth and development even today.

Data and Methodology

In this paper we use quarterly data for 2006–2015 from Montenegro. The data is taken from the Central bank of Montenegro and National Statistical Office (NSO). The reason why we focus here on data sample from 2006 is the fact that our NSO doesn't provide data from the previous period on the majority of the variables treated in this paper. It is mostly due to the independence in 2006. The choice of variables representing financial development indicators are chosen as originally presented in Saci and Holden (2008). Since financial development is very complex concept, we used many measures of the size of financial intermediation and of the efficiency of the financial sector. Because of the special characteristics of Montenegrin economy, especially due to the euroization and therefore lack of monetary policy,

we had to use some proxy for the data which Montenegrin Central bank does not produce (for example, monetary aggregates).

CBA – The ratio of commercial banks' assets to all bank assets (commercial banks' assets + CBM assets) is frequently used as a measure that indicates an expansion of the financial sector (Levine, Loayza and Beck 2000). It represents a degree to which commercial banks versus the central bank allocate savings (Levine, Loayza and Beck 2000; Rioja and Velv 2004; Saci and Holden 2008).

DCGDP – Domestic credit to the private sector as a percentage of GDP is the most frequently used indicator for the level of financial services. It is one of the main measures of financial development used in recent empirical studies (Shan, Morris, and Shan 2005; Zang and Kim 2007). Higher level of this ratio indicates lower transaction costs and higher levels of financial services and therefore greater financial intermediary development (Saci and Holden 2008).

DCDEP – We used the ratio of domestic credit to the private sector to the total deposits as a proxy for the efficiency of the banking sector. The ratio indicates the degree of efficiency in transferring savings into private investments. Higher ratio implies the more efficient banks in allocating capital to investors (Lynch 1994).

DEP – In order to proxy the measure for the overall size of the financial intermediary sector, we used the ratio of deposits to GDP. Liquid liabilities M3 as a percentage of GDP (M3/GDP) is used at Rioja and Velv (2004), Saci and Holden (2008), and Cojocaru et al. (2016). This measure indicates the level of the liquidity provided to the economy.

HS – A structure of the financial system is important information when analyzing the development level of the financial system. Households' savings and time deposits to households' demand deposits ratio are used to assess the importance of its different components. Since the households' demand deposits reflects the function of money as a means of payment, the households' savings and time deposits are proxy for the broad money indicator, reflecting the importance of the savings. Hence, this indicator should give the evidence of the country's level of financial development.

Stock market is one very important component of the financial system in the country. Therefore, to measure its development, we used the ratio of stock market capitalization to GDP. As literature suggests, stock market size is expected to positively associate with the market ability to allocate capital and manage risk (Arestis, Demetriades, and Luitel 2001; Saci and Holden 2008).

SETMC – For measuring stock market size we used the stock ex-

TABLE 1 Financial Development Variables

CBA	Commercial banks' assets to all bank assets
DCGDP	Domestic credit to the private sector as a percentage of GDP
DCDEP	Domestic credit to the private sector to the total deposits
DEP	Deposits to GDP
HS	Households' savings and time deposits to households' demand deposits
MC	Market capitalization to GDP
SETMC	Trading volume of the stock market to the market capitalization
SETGDP	Stock exchange turnover to GDP
FDI	Foreign direct investment to GDP
PC1–PC3	Principal components of nine variables listed above

change turnover ratio. It presents the trading volume of the stock market relative to the market capitalization, i.e. its size. This indicator reflects well market liquidity (Rousseau and Watchtel 2002).

SETGDP – As a measure for the stock market activity we used the ratio of stock exchange turnover to GDP. It is good indicator measuring trading volume relative to the size of the economy, reflecting both liquidity and size of the market (Beck and Levine 2002).

FDI – Besides all this financial variables, we consider an additional variable that is very important for the economic growth in Montenegro. FDI had an extremely important role for the Montenegrin economy in the last ten years. Therefore, the ratio of foreign direct investment to GDP is used.

As a dependent variable in our model, we used data on quarterly GDP from 2006 to 2015. We used the first difference logarithm of the series in order to solve non-stationarity problem. A model in this paper is estimated using ordinary least square method.

All measures of financial system development are measured in natural log units.

The list of variables is summarized in table 1 and table 2 presents the simple correlation coefficients between all the variables. As noted in the table 2, a lot of variables have significant correlation, with the highest positive being 0.818 for DCGDP and DCDEP, 0.771 for SETGDP and FDI, 0.722 for HS and GDP, and 0.708 for CBA and DCDEP. These results suggest that there might be some redundancy in the data, provided by our chosen variables.

Principal Components Analysis (PCA) is one of the most frequently used multivariate data analysis. The main objective of principal component analysis is to decrease the dimensionality in data. PCA could be considered as a projection method which projects observations

TABLE 2 Correlations of the Variables

Var.	CBA	DCdep	DCgdp	DEP	FDI	HS	MC	SETMC	SETgdp
DCdep	0.708*	1.000							
DCgdp	0.585*	0.818*	1.000						
DEP	0.115	0.110	0.656*	1.000					
FDI	−0.084	0.165	0.193	0.076	1.000				
HS	0.648*	0.371*	0.433*	0.331*	−0.449*	1.000			
MC	−0.262	−0.031	0.128	0.216	0.575*	−0.544*	1.000		
SETMC	−0.193	0.204	0.083	−0.198	0.671*	−0.684*	0.590*	1.000	
SETgdp	−0.288	−0.079	−0.150	−0.201	0.771*	−0.703*	0.678*	0.699*	1.000
GDP	0.186	−0.034	0.330*	0.692*	−0.432*	0.722*	−0.365*	−0.725*	−0.617*

NOTE Significant at 5% level.

from an n-dimensional space with n variables to a k-dimensional space (where $k < n$), in a way to conserve the maximum amount of information from the initial dimensions. This mathematical procedure transforms a number of correlated variables into a usually smaller number of uncorrelated variables called PCS. The first component extracted accounts for a maximum amount of total variance in the observed variables. The second component extracted will account for a maximum amount of variance in the data set that was not accounted for by the first component. With each new component there is progressively less and less amount of variance and that is why only few components are worth retaining and interpreted.

Let us formalize principal components analysis (according to Johnson and Wichern 2007). Let the N-dimensional random vector $X = X_1,\ldots,X_N$ has the covariance matrix $\sum$ with eigenvalues $\lambda_1 \geq \lambda_2 \geq \cdots \geq \lambda_N \geq 0$. If $\omega_i = (\omega_{i1},\ldots,\omega_{iN})$ is N-dimensional vector, where $i = 1,\ldots,N$, then we can define linear combinations as:

$$Y_i = \omega_i^{'} X = \sum_{j=1}^{N} \omega_{ij} X_j. \tag{1}$$

These linear combinations of variables $X_1,\ldots,X_N$ are also random variables with variance and covariance:

$$\begin{aligned} Var Y_i &= \omega_i^{'} \sum \omega_i, \qquad i = 1,\ldots,N \\ Cov(Y_i, Y_j) &= \omega_i^{'} \sum \omega_j, \qquad i,j = 1,\ldots,N \end{aligned} \tag{2}$$

The principal components are uncorrelated linear combinations of $Y_1, Y_2,\ldots, Y_N$ whose variances in (2) are as large as possible. Since $Var(Y_i)$ can easily be increased by multiplying any ω_i by some scalar, in the definition of principal components we need the weight vectors to have a unit norm, therefore $\omega_i^{'}\omega_i = 1$.

TABLE 3 KMO and Bartlett's Test

Kaiser-Meyer-Olkin measure of sampling adequacy		0.655
Bartlett's test of sphericity	Approximate χ^2	191.691
	Degrees of freedom	36.000
	Significance	0.000

We therefore define:

- the first principal component PC1 as a linear combination $Y = \omega_i^{'}X$ with maximal variance, subject to restriction $\omega_i^{'}\omega_i = 1$.
- the second principal component PC2 as a linear combination $Y_2 = \omega_2^{'}$, $Y_1 = \omega_1^{'}X$ with maximal variance, subject to restrictions $\omega_2^{'}\omega_2 = 1$ and $Cov(Y_1, Y_2) = 0$.
- i-th principal component (for $i \leq N$) as a linear combination $Y_i = \omega_i^{'}X$ with maximal variance, subject to restrictions $\omega_i^{'}\omega_i = 1$ and $Cov(Y_1, Y_2) = 0$ for all i,j.

Empirical Results

First thing we do is checking sampling adequacy for our nine variables indicating financial development. It is done by Kaiser-Meyer-Olkin measure and Bartlett's test of sphericity.

The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy is a statistic which indicates the proportion of variance in variables which is common variance, i.e. which might be caused by underlying factors. High values (close to 1.0) generally indicate that a principal component analysis may be useful with data. If the value is less than 0.50, the results of the PCA probably won't be very useful. We have obtained the value of this measure equal to 0.655, which is satisfactory.

Bartlett's test of sphericity tests the hypothesis that correlation matrix is an identity matrix, which would indicate that selected variables are unrelated and therefore unsuitable for structure detection. Small values (less than 0.05) of the significance level indicate that a PC analysis may be useful with your data. Our signature level is lower than 0.05 so it indicates that our data is suitable for PC analysis. Table 3 shows two tests which indicate the suitability of the data for our further analysis.

After testing the additional assumptions of PCA, we proceed to the extraction process. We chose selections to produce a solution using principal components extraction, which is then rotated for the ease of interpretation. We selected VARIMAX type of rotation. In the table 4 we can see initial eigenvalues, total percentage of variance ex-

TABLE 4 Total Variance Explained

Comp.	Initial eigenvalues			Rotation sums of squared loadings		
	(1)	(2)	(3)	(1)	(2)	(3)
1	4.265	47.384	47.384	3.685	40.945	40.945
2	1.649	18.326	65.710	2.064	22.930	63.875
3	1.117	12.414	78.124	1.282	14.249	78.124
4	0.750	8.331	86.455			
5	0.431	4.786	91.241			
6	0.345	3.830	95.070			
7	0.278	3.085	98.156			
8	0.117	1.296	99.451			
9	0.049	0.549	100.000			

NOTES Column headings are as follows: (1) total, (2) percentage of variance, (3) cumulative percentage.

plained per variable and cumulative percentage. Also, the rotated components are displayed.

This first section of the table shows the Initial Eigenvalues. The Total column gives the eigenvalue, or amount of variance in the original variables accounted for by each component. The percent of Variance column gives the ratio, expressed as a percentage of the variance accounted for by each component to the total variance in all of the variables. The Cumulative percent column gives the percentage of variance accounted for by the first *n* components.

We decided that eigenvalues greater than 1 are to be extracted (according to Kaiser criteria), so the first three principal components form the extracted solution.

The second section of the table 4 shows the rotated components.

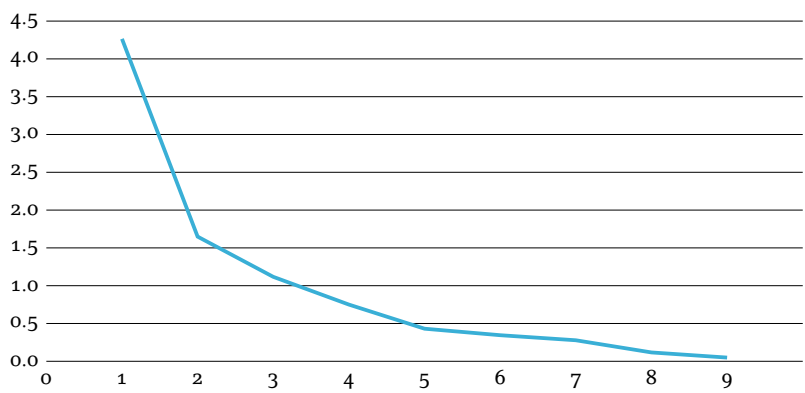

FIGURE 1 Scree Plot

TABLE 5 Rotated Component Matrix Component

Variable	Component		
	1	2	3
CBA	0.138	0.837*	0.098
DCdep	0.572*	0.763*	0.007
FDI	0.872*	−0.020	0.054
SETgdp	0.873*	−0.004	−0.017
SETMC	0.866*	0.071	−0.234
DCgdp	0.790*	0.483*	−0.184
DEP	0.224	−0.717*	0.264
HS	0.614*	0.167	−0.453*
MC	−0.118	−0.025	0.952*

NOTES Extraction method: principal component analysis; rotation method: varimax with Kaiser normalization. Rotation converged in 5 iterations. All abbreviations used in the model are explained in table 1.

They explain nearly 78.124% of the variability in the original nine variables, so we considerably reduce the complexity of the data set by using these three components.

We also looked at the scree plot (figure 1) which shows the eigenvalues for initial components. It is used to help determine the optimal number components to retain in the solution. For a good analysis, this chart will look roughly like the intersection of two lines. Generally, the factors you want to keep are the ones on the steep slope. The ones on the shallow slope contribute relatively little to the solution, and can be excluded. From our scree plot we can also decide to select three components.

Rotation is a method used to simplify interpretation of extracted components. Often, the relationships between the observed variables and the unrotated factors can be complex. For instance, several observed variables may load on more than one component, making interpretation difficult. Since we have extracted three components, interpretation for them can be seen in table 5 where component matrix is shown. In table 5 we marked the highest loading for each variable and can see which component every variable gives to the highest contribution.

From this rotation component matrix, our set of nine variables can be subdivided in three components, and by looking at the highest contribution we can name these components. First component can be named as *a general measurement of financial development.* As we can see, it has a positive contribution from most of variables used – five of them. The second component can be named as *the effi-*

TABLE 6 OLS Estimation Results

Variable	Coefficient	*t*-Statistic	Prob.
DLGDP(−1)	−0.129	−1.969	0.059
PC1	0.011	3.148	0.004
PC2	0.007	2.452	0.021
PC3	−0.005	−1.557	0.131
D2009Q1*	−0.137	−9.356	0.000
D2010Q2*	−0.056	−3.819	0.001
D2010Q4*	0.086	5.825	0.000
D2012Q1*	−0.073	−4.866	0.000
D2007Q1*	0.083	5.560	0.000
Constant	0.019	7.134	0.000

NOTES No. of observations = 38, adjusted R^2 = 0.867, SE of regression = 0.014, *F*-statistic = 27.955 (0.000), Breusch-Godfrey serial correlation LM test = 0.708 (0.594). *The regression includes dummy variables for modelling some sudden changes (shocks) in the data.

ciency of the banking sector since the highest positive contribution is given by two variables (CBA and DCdep), while negative contribution is given by variable measuring percentage of deposits in GDP; the third one could be named *a stock market development* because the highest contribution is given by variable measuring market capitalization to GDP.

After extracting these three components of financial development, we modelled regression to analyze how those components affect the GDP in Montenegro. So, dependent variable is first difference of logarithm of GDP and the independent variable is, beside named components, a lagged dependent variable. Estimated model is shown in table 6. We used the OLS method for estimation of our regression.

There are two main reasons for choosing these specific dummy variables in the aforementioned model. The one lies in the fact that there was a high inflow of the FDI in Montenegro at the end of 2006 and in the beginning of 2007 causing enormous trade volume on the stock market (D2007Q1), and the sharp peak in the commercial bank assets in the end of 2008 and beginning of 2009 (D2009Q1). The second reason for using the other dummy variables is to eliminate obvious extraordinary deviations from the normal movement in order to achieve more precise estimates of controlled factors (observed after plotting variables of the model and based on residuals). According to the results of the model reported in table 6, the first and the second principal components have significant positive influence on GDP, while the third component does not show a significant relation

to dependent variable. The results of serial correlation LM test are satisfactory as indicated with Breusch-Godfrey test statistic.

The results presented within our model suggest that economic development measured by the first difference of natural logarithm of GDP is positively related to general financial development and the efficiency of the banking sector. Our model did not confirm the positive influence of the stock market development on the economic development.

We are aware that presented results are limited since our data set is quite poor. Namely, there are many variables that should be included in the model but they are not reported because they are unavailable. For example, data on quarterly real GDP growth are not published by Montenegrin national statistical office. Very short time series are also a significant obstacle for more advanced econometric modelling. That is why we decided to employ the simplest model.

Conclusion

In this article, we empirically assess the relationship between financial and economic development in Montenegro from 2006 to 2015. We found this country specific example very interesting because Montenegro went through various changes of financial system, starting from the transition processes and passing across the financial crisis, leaving financial system very vulnerable. Since Montenegrin financial system is very simple and undeveloped, we wanted to identify the main elements of financial development and to investigate which one had the most important role in stimulating economic development. We employed nine indicators representing our financial system and, in order to reduce the multicolinearity problem, we used the principal component analysis to extract few measures of the financial development.

Our results indicated that three of nine components are worth retaining for the further analysis. The regression results show that financial development has a positive effect on economic development. Economic development is found to be influenced by general financial development and the efficiency of the banking sector. However, our results are based on a shorter time series so the use of more sophisticated econometric techniques is limited for this sample span. It would be interesting, if additional data is available, to verify how the relationship between financial development and economic growth will change especially as Montenegrin economy continues to mature. Moreover, additional research could be done, particularly in the light of financial development in euroized economy. How-

ever, it is the first paper regarding this topic that actually applies to Montenegro.

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Abstracts in Slovene

Učinek delovnega stresa in spoprijemanja na organizacijsko pravico: empirična raziskava v turških telekominikacijah in bančništvu

Tutku Seçkin-Çelik in Ayşe Çoban

Cilj pričujočega članka je raziskati vlogo mehanizmov spoprijemanja in delovnega stresa na delavčevo zaznavanje organizacijske pravice. Raziskava je bila narejena s pomočjo vprašalnika, kjer je sodelovalo 211 »belih ovratnikov« – zaposlenih v bančni in telekomunikacijski industriji. Da bi razumeli učinek mehanizmov spoprijemanja in delovnega stresa na organizacijsko pravico, smo izvedli multiplo regresijsko analizo. Rezultati so pokazali, da na splošno zaznavanje pravice negativno vpliva delovni stres in pozitivno vplivajo mehanizmi spoprijemanja, razen na čustva osredotočeno spoprijemanje. So pa poddimenzije organizacijske pravice pokazale značilne odnosne vzorce. Zato smo sklenili, da pri delavčevem zaznavanju organizacijske pravice irgajo vlogo tako posamezne kot organizacijske določilnice.

Ključne besede: organizacijska pravica, delovni stres, spoprijemanje, telekomunikacije, bančništvo
Management 11 (4): 271–287

Kako milenijci dojemajo svoje delodajalce in kako to vpliva na njihovo delovno etiko? Raziskava v Hong Kongu

Tsun-Lok Kwong

Delovna etika zaposlenih milenijcev v Hong Kongu zbuja veliko pozornosti. Pričujoči članek raziskuje, kako milenijci dojemajo svoje delodajalce oz. kako to vpliva na njihovo delavno etiko. Anketa, na katero je odgovorilo 212 milenijcev, je pokazala, da milenijci na splošno svoje delodajalce dojemajo pozitivno in prisegajo na dobro delovno etiko. Dve spremenljivki - percepcija in delovna etika - sta pomembno povezani. Raziskava je tudi razkrila, da milenijci v Hong Kongu izkazujejo nenavadne interpretacije dela in prostega časa ter dela in uspeha. Rezultati namigujejo na to, da bi na te interpretacje lahko vplivali starši, izobraževalni sistem in sodobno delovno okolje.

Ključne besede: milenijci, delovna etika, percepcija, psihološka pogodba, Hong Kong
Management 11 (4): 289–308

Upravljanje akademsko-industrijske mreže

Sergej Gričar in Barbara Rodica

Namen pričujoče študije je razpravljanje o pomembnosti sodelovanja in ločevanja med akademijo in industrijo. Partnerstvo med akademijo

in industrijo je uresničljiv dejavnik, ki vpliva na inovacije na področju prehoda študentov na zaposlitveni trg. Empirično gradivo je bilo zbrano in analizirano na podlagi podatkov, ki jih je zbral Javni sklad Republike Slovenije za razvoj kadrov in štipendije. Podatki se nanašajo na več akademsko-industrijskih mrežnih projektov, ki jih je financirala prej omenjena organizacija. Anketna študija primera začrta štiri primere projektov, ki jih je izvajala Fakulteta za podjetništvo, management in informatiko. Rezultati razkrijejo prizadevanja za izmenjavo znanja in izkušenj, kar bi pomagalo industriji, da postane kompetitivnejša, hkrati pa omogočilo študentom boljšo zaposljivost in karierne možnosti.

Ključne besede: akademija, industrija, inovacija, študija primera
Management 11 (4): 309–326

Pripravljenost Evropske Unije na četrto industrijsko revolucijo

Éva Kuruczleki, Anita Pelle, Renáta Laczi in Boglárka Fekete

Znanje je v razvitih gospodarstvih postalo ključen dejavnik produkcije razvite ekonomije in ker so ljudje nosilci in uporabniki znanja, izkušeni človeški viri pridobivajo podobno velik pomen. Ti napredki so elementi znatnih sprememb, ki karakterizirajo četrto industrijsko revolucijo - fenomen, vreden preučevanja v potankostih. Evropska unija se je eksplicitno zanimala za premik k ekonomiji znanja od lisbonskega summita leta 2000 dalje. Več kot desetletje in pol kasneje lahko preučimo pripravljenost EU, da sprejme na znanju temelječo četrto industrijsko revolucijo. Tega se lotimo z oblikovanjem indeksa, osnovanega na različnih povezanih podatkih.

Ključne besede: 4. industrijska revolucija, na znanju temelječe gospodarstvo, človeški kapital, Evropska unija
Management 11 (4): 327–347

Dokazi o ekonomski rasti in finančnem razvoju v Črni gori

Milena Lipovina-Božović in Julija Cerović Smolović

Makroekonomska rast mora biti podprta s stabilnim in učinkovitim finančnim sistemom. Ko analiziramo odnos med rastjo in finančnim razvojem, zasledimo mnoge različne razvojnofinančne ukrepe. V članku bomo identificirali mnoge pomembne pokazatelje finančnega razvoja v Črni gori. Glede na dejstvo, da se je v zadnjem desetletju črnogorski finančni trg razvijal, želimo ugotoviti, ali je to dejstvo vplivalo na gospodarsko rast pa tudi ali obstaja pomemben pozitiven odnos med rastjo in finančnim razvojem. Namen pričujočega članka je uporaba osnovnih komponent z namenom preučitve korelacije med indikatorji in najti sredstva oz. glavne komponente. Prednost te tehnike je prikaz splošnejših ukrepov finančnega razvoja namesto individualnih spremenljivk bančnega razvoja oz. razvoja delniškega trgov. Zaključimo

lahko, da je težko identificirati specifične komponente finančnega sistema, najpogosteje povezane z gospodarsko rastjo.

Ključne besede: gospodarska rast, finančni razvoj, analiza glavnih komponent
Management 11 (4): 327–347